

DEGREE THESIS or DIPLOMA THESIS

Name: Ambrocio Rainer Pier Paolo
Date of preparation: 15 February 2024

**University of Debrecen
Faculty of Health Sciences
Department of Public Health**



Ambrocio Rainer Pier Paolo
Health Care and Disease Prevention (Public Health), BSc

**Knowledge and attitude towards human monkeypox
among high school students in the Philippines**

Supervisor:
Anita Barth
Faculty of Health Sciences, University of Debrecen

Gergő József Szöllősi
Faculty of Economics and Business, University of Debrecen

2024
PLAGIARISM DECLARATION

I, the undersigned AMBROCIO RAINER PIER PAOLO (Neptun code: XB08AO) by signing this declaration declare that this Thesis entitled “*Knowledge and attitude towards human monkeypox among high school students in the Philippines*” is my own and independent work, and both the printed and electronic literature was used in line with the copyright regulations, the Code of Ethics of University of Debrecen, and Academic and Education Rules and Regulations. During my work I only used resources which I have referred to in the List of Reference, or I have indicated next to the referred text or table.

I acknowledge that it is considered plagiarism when

- providing a verbatim quote without quotation marks and references;
- citing content without indicating a reference;
- presenting the published thoughts of others as my own.

I declare that I have become familiar with the concept of plagiarism and I acknowledge that if the submitted Thesis violates copyright, then according to Article 27 (9) of the Academic and Examination Regulations, the Thesis will automatically be graded as ‘failed’, and I will be obliged to complete the Thesis again, furthermore disciplinary proceedings may be initiated against me.

I also declare that the requirements of working individually have been met while preparing the Thesis, and I have not misled in this regard the supervisor or the lecturer who assigned me the topic, furthermore, neither the Thesis nor any part of it was submitted as a degree thesis/diploma thesis at another higher education institution.

Date: 15 February 2024



AMBROCIO RAINER PIER PAOLO
student's signature

UNIVERSITY OF DEBRECEN ELECTRONIC ARCHIVE -
PLACEMENT DECLARATION OF
DEGREE /DIPLOMA THESES OF STUDENTS

With your present signature (as the author i.e., the owner of copyrights)

1. you grant the Electronic Archive of the University of Debrecen (DEA) the non-exclusive right to distribute, convert (without changing the content, in order to ensure preservation and accessibility) and/or publicly display the document you upload (including the abstract) in electronic formats ;
2. you agree that DEA will store more than one copy of your uploaded Degree / Diploma Thesis (hereinafter: Thesis) for security, recovery and preservation purposes;
3. you declare that the document you want to upload is your intellectual creation and that you have the right to ensure the rights contained in this agreement regarding the Thesis. Aware of your criminal liability, you further declare that the Thesis is original and, to the best of your knowledge, does not infringe anyone else's copyright;
4. if the upload is based on a thesis sponsored by a company or organization, you declare that you have the right to make this declaration;
5. you declare that you have uploaded an electronic version to the DEA which is identical to the printed Thesis submitted to the Student Administration and Student Advisory Office, which you recognize as the official original version;
6. you accept that the works stored in the DEA become accessible on the world wide web under the conditions determined by the Faculty of Health Sciences;
7. you acknowledge that the operators of the DEA do not undertake any obligations towards the placer i.e. the persons exercising the rights, if the placed material violates the provisions relating to intellectual property or other provisions.

Name: Ambrocio Rainer Pier Paolo

Degree program: Health Care and Disease Prevention (Public Health), BSc

Institute: Faculty of Health Sciences

Date: 15 February 2024



AMBROCIO RAINER PIER PAOLO
student's signature

DECLARATION ON IDENTICAL TEXTS

I, the undersigned AMBROCIO RAINER PIER PAOLO(Neptun code: XB08AO), student at the University of Debrecen Faculty of Health Sciences, Health Care and Disease Prevention (Public Health), BSc degree program and PUBLIC HEALTH specialization aware of my criminal liability, I declare and certify that the printed and electronic versions of my Thesis are identical to the version that was run by the plagiarism detecting software called Turnitin.

Date: 15 February 2024



AMBROCIO RAINER PIER PAOLO
student's signature

EVALUATION FORM OF THE DEGREE / DIPLOMA THESIS

2024

Name of the student:
Title of the Thesis:
Name of the evaluator (opponent):
Registration number:
Identification number:

Evaluation	
The choice of topic	Points (0-5)
The choice of topic fully meets the requirements of the Thesis as it is related to professional knowledge, can be conducted independently, is suitable for the student to prove his/her theoretical and practical skills, as well as his/her ability to use the literature (4-5 points)	
The choice of topic partially meets the requirements of the Thesis (e.g. it is barely related to professional knowledge, its novelty is debatable, independent work is partially or not at all visible, etc.) (1-3 points)	
The choice of topic does not meet the requirements of the degree/diploma thesis. (0 points)	
<i>Suggested points:</i>	
Methods and Results	Points (0-60)
The documentation of the methods and results fully meets the requirements, the Thesis is nicely edited , aesthetic, and is in line with its content. The analysis and interpretation of the results is excellent , the student is able to form an independent opinion on the topic of the Thesis. The content requirements for the Thesis such as the choice of methods, observations, measurements, implementation of physiotherapy procedures, or drawing of conclusions) were absolutely fulfilled. (56-60 points)	
The documentation of the methods and results meets the requirements, the documentation is well edited , aesthetic, and is in line with its content. The analysis and interpretation of the results are appropriate , the student is able to form an independent opinion on the topic of the Thesis. The content requirements for the Thesis such as the choice of methods, observations, measurements, implementation of physiotherapy procedures, or drawing of conclusion were fulfilled. (41-55 points)	
The documentation of the methods and results basically meets the requirements, but there are minor deficiencies . The analysis and interpretation of the results is adequate , but the student is less able to form an independent opinion on the topic of the thesis. The content requirements and formal requirements for the Thesis were fulfilled with minor deficiencies. (31-40 points)	
The documentation of the methods and results or the analysis and interpretation of the results only partially meet the requirements and there are many deficiencies . The Thesis only partially fulfils the content requirements. (16-30 points)	

	The documentation of the methods and results shows significant deficiencies , but there are elements that can be evaluated. The analysis and interpretation of the results is still acceptable , but the student did not form an independent opinion on the topic of the Thesis or compare his/her own results with other research results. The content requirements for the thesis/diploma thesis were met with major deficiencies , but there are elements that can be evaluated. (1-15)	
	Documentation of methods and results is not adequate . The analysis and interpretation of the results is not adequate , the student is not able to form an independent opinion on the topic of the thesis. The content requirements for the Thesis were not met . (0 points)	
	<i>Suggested points:</i>	
Formal requirements and formatting		Points (0-10)
	The structure of the thesis and the terminology, style and typography used by the student are excellent , the Thesis fully meets the formal requirements. (9-10 points)	
	The structure of the thesis and the terminology, style and typography used by the student, or the formal requirements of the Thesis differ to a lesser extent from what is expected. (7-8 points)	
	The structure of the thesis and the terminology, style and typography used by the student, or the fulfilled formal requirements of the Thesis is of substandard . (4-6 points)	
	The structure of the thesis and the terminology, style and typography used by the student, or the formal requirements of the thesis, differ greatly from the requirements, but there are parts of the Thesis that can be evaluated. (1-3 points)	
	The structure of the Thesis does not meet the requirements. (0 points)	
	<i>Suggested points:</i>	
Conclusions and recommendations		Points (0-15)
	Application of results; the student's reasoning; interpretation of data and sources; logical consistency; critical reflections, the objectivity of presenting opinions; or seeing interrelations is excellent ; the student draws new and coherent conclusions. (11-15 points)	
	Application of results; the candidate's reasoning; interpretation of data and sources; logical consistency; critical reflections; the objectivity of presenting opinions; or seeing interrelations more or less meet requirements; the student's conclusions contain minor errors . (6-10 points)	
	Application of results; the candidate's reasoning; interpretation of data and sources; logical consistency; critical reflections, the objectivity of the presenting opinions; or seeing the interrelations meet the requirements to a small extent ; the student's conclusions contain significant errors . (1-5 points)	
	Application of results; the candidate's reasoning; interpretation of data and sources; logical consistency; critical reflections, the objectivity of presenting opinions; or seeing interrelations does not meet the expectations; the student's conclusions are inadequate . (0 points)	
	<i>Suggested points:</i>	
References, List of references, Appendices		Points (0-10)
	The student has a significant knowledge of the national and international literature on the topic. The content citations are correct; references and the List of References meet the formatting requirements; the subject of the appendices and the Thesis are coherent and excellently interpretable . (9-10 points)	

	The student knows the national and international literature of the topic to the expected extent . Content citations are correct; references and the List of References contain minimal errors ; the subject and the coherence of the appendices and the Thesis are somewhat difficult . (7-8 points)	
	The student knows the national and international literature of the topic to a lesser extent . Correctness of content citations; references and the formal consistency of the List of References contain major errors ; the coherence and interpretability of the appendices and the topic of the Thesis encounter difficulties . (4-6 points)	
	The student has little knowledge of the national and international literature on the topic. Content citations are correct; references and the formatting consistency of the List of Reference contain significant errors ; the coherence and interpretability of the appendices and the topic of the Thesis face significant difficulties . (1-3 points)	
	The student does not know the national or international literature of the topic, he/she only has textbook knowledge. Content citations are correct; the formal consistency of references and the List of Reference is significantly inadequate ; the subject of the appendices and the Thesis is not coherent and cannot be interpreted. (0 points)	
	Suggested points:	
	Total points:	
	0–60 points: (1) fail 61–70 points: (2) sufficient 71–80 points: (3) satisfactory 81–90 points: (4) good 91–100 points: (5) excellent	
	Suggested grade: (In writing and with a number)	

Guide to evaluation

Choice of topic, and up-to-dateness

Choice of topic and title: Is it important regarding the scientific field? Is it in line with the preparedness and potentials of the students? Does the title match with the content of the Thesis?

Researcher's question: The novelty and significance of the researcher's question, autonomy in forming the question.

Methods and results

Data collection and processing: degree of difficulty, versatility of methods, accuracy of description, adequacy, appropriate sampling and/or appropriate range of sources; the authenticity, orderliness and appropriate way of recording and processing the data.

Presentation of results: How accurate, thorough, detailed, and clear is the presentation of the results, and how adequate and illustrative is the documentation.

Formal requirements

Terminology: Consistent application of the conceptual apparatus that are necessary for the given analysis in accordance with the conventions of the given scientific field.

Structure, formal requirements: The proportions of the chapters, the logic of dividing the main and sub-chapters.

Style: The spontaneity and fluidity of the wording.

Typography: Corrected/uncorrected misspellings.

Conclusions and recommendations

Application of the results, reasoning: Interpretation of the data and sources; logical consistency; critical reflections, objectivity in presenting opinions; seeing interrelations; new and coherent conclusions.

Alternative explanations.

Publishability and/or practical application; the changes required for these.

References, List of references, appendices

Correctness of content citations; formal consistency in references and in the List of references; the relationship between the appendices and the topic of the Thesis; manageability of the appendices, processing national and international literature related to the topic.

Evaluation in writing according to the points of evaluation

Without written evaluation neither the establishment of conditions that made evaluation possible nor the evaluation in grade is valid.

Questions asked by the evaluator (opponent) (minimum 1 question is obligatory):

8.
...

9.
...

Date:.....

.....
Signature of the evaluator

ANSWER TO THE EVALUATION OF THE THESIS

Name of the Student: Title of the Thesis „Assessing and improving the musculoskeletal condition of second-year physiotherapist students"

Date:

Dear Mr/Ms,
thank you for reading and evaluating my Thesis

.....
.....
...
.....
...
.....
...
.....
...

My answers to the questions you asked:
Question 1

Answer.....
.....
.....
.....
.....

Question 2

Answer.....
.....
.....
.....
.....

Best Regards,

.....
Signature of the student

TABLE OF CONTENTS

LIST OF TABLES.....	12
LIST OF FIGURES.....	12
LIST OF ABBREVIATIONS.....	13
ABSTRACT	14
INTRODUCTION	15
1. LITERATURE REVIEW	17
1.1 Pathology, Virology and Clinical Features.....	17
1.2 Risk Factors and Transmission.....	18
1.3 Diagnostic Management and Treatment	20
1.4 Prevention and Vaccination	22
1.5 Current outbreak around the world and in the Philippines	23
1.6 Knowledge level on human monkeypox.....	24
OBJECTIVES.....	26
MATERIALS AND METHODS.....	27
4.1 Subject and Study Setting	27
4.2 Data Collection.....	27
4.3. Questionnaire	27
4.3 Data Analysis	28
RESULTS.....	29
5.1 Socio-demographic and economic background of the respondents	29
5.2. Knowledge Level of Students	30
5.3. Attitude among high school students	32
5.4. Factors affecting the knowledge level.....	34
DISCUSSION.....	37
CONCLUSION	40
ACKNOWLEDGEMENT	41
REFERENCES	42
APPENDIX	50
Appendix 1. Knowledge and Attitude Questionnaire	50
Appendix 2. Personal Contribution.....	53

LIST OF TABLES

Table 1. Diagnostic tests for Monkeypox.....	22
Table 2. Socio-demographics and economic characteristics of the study respondents	30
Table 3 Attitudes about monkeypox among high school students	33
Table 4. Multiple logistic regression of knowledge level and different variables	35
Table 5. Multiple logistic regression of knowledge and attitude towards human monkeypox	37

LIST OF FIGURES

Figure 1 The rash associated with human monkeypox virus infection characterised with deep-seated vesicular or pustular skin rash with centrifugal distribution	18
Figure 2 Pathway of Monkeypox transmission from animal to human and human to human	20
Figure 3 Cervical lymphadenopathy due to active monkeypox case on 1996 to 1997 in Democratic Republic of Congo	21
Figure 4 Cumulative cases of Monkeypox visualized in world map as of 8 March 2023 ..	24
Figure 5 Graph of students and their corresponding accumulated knowledge scores.....	31
Figure 6 Proportion of good answers in basic knowledge test among high school students	32

LIST OF ABBREVIATIONS

DNA – Deoxyribonucleic acid

MPX - Monkeypox

MPXV - monkeypox virus

OPVX PCR – Orthopox virus polymerase chain reaction

WHO – World Health Organization

CA – Central Africa

WA – West Africa

ABSTRACT

A steep and rapid rise in the number of human monkeypox (MPX) cases across the world has raised concerns. Now, it is crucial that the information dissemination for the prevention of human MPX is established.

The research aims to determine the knowledge level of high school students in the Philippines on the essential information and preventive methods against human MPX, to identify the possible factors influencing the knowledge level and to assess the attitude towards the current problem caused by human MPX.

In this qualitative, cross-sectional study a well-structured questionnaire was developed. The questionnaire included questions related to socio-demographic and economic background, attitudes toward monkeypox and a validated knowledge test. The data collection started on 9 March, 2022.

Results showed that 67% of 691 student sample population knew that the disease is do not only affects male but also female individuals, that hand sanitizers and face masks are an important tool in preventing monkeypox, that skin rash is one of the symptoms of monkeypox, and that initial symptoms of monkeypox are similar to flu. Additionally, 53.11% of the respondents agreed that monkeypox prevention and control measure are adequately available, and 41.82% had a negative feeling about monkeypox virus. More than half of the sample population agreed that traveling to monkeypox virus infected countries is risky, that the global population is capable to control the epidemic, and that monkeypox will become a pandemic like the COVID-19.

Results showed that students had low knowledge on basic information, but had a positive attitude towards learning more on the subject. Information drive educating the population of the facts about monkeypox is recommended to increase awareness and its prevention.

INTRODUCTION

Monkeypox virus has been initially isolated from cynomolgus monkeys in Copenhagen, Denmark by Preben Christian Alexander von Magnus of Statens Serum Institut in late (Bryer et al., 2022; Gessain et al., 2022; Guarner et al., 2022). Its name was coined after the first organism where this virus was first isolated, however the name of this virus is considered inaccurate since this virus under orthopoxvirus are later detected on rope squirrels, tree squirrels, Gambian pouched rats, dormice, and prairie dogs as a natural host to monkeypox virus and are considered as the primary drivers for zoonotic transmission (Bryer et al., 2022; Guarner et al., 2022)

In September 1970, the first human transmission was recorded in Democratic Republic of Congo, and since this first detection on human, the cases of monkeypox infection are primarily reported from the Central and Western Africa (Bryer et al., 2022). This first case was associated with a 9-month-old child that was admitted to Basankusu Hospital as suspected case of smallpox (Saied et al., 2022)

The first outbreak of monkeypox in the United States in 2003 recorded 47 cases across 6 states of Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin – this is also considered as the first outbreak outside the African region. According to US Centre for Disease Control and Prevention, the outbreak was tracked down to the shipment of prairie dogs to Texas in April 2003 from Ghana. Individual who had contact with these pet prairie dogs manifested signs and symptoms of monkeypox. The investigation revealed that these pets were shipped alongside with approximately 800 small mammals of nine different species including six types of rodents. The CDC laboratory testing that these rodents have tested positive for monkeypox virus infection – two African giant pouched rats, nine dormice, and three rope squirrels (Centers for Disease Control and Prevention, 2022a)

There have been 90,656 confirmed cases of human monkeypox identified across the globe -- 84,858 of these cases originated from 103 nations that do not have a history of establishing reports of monkeypox in the past (Centers for Disease Control and Prevention, 2023a). According to the Department of Health (2022), as of September 2022, there have been a total of four (4) current cases of this disease that have been recorded in the Philippines (Department of Health, 2022)

Recent study assessing the knowledge of monkeypox in the general population in Saudi Arabia have shown that the large percentage of participants were aware of the infectious disease that the monkeypox virus presents. Additionally, monkeypox outbreak was not seen as a form of conspiracy or an act of bioterrorism. According to Alshahrani et al., (2022), seventy (70) percent of the participants knew that the virus is contagious, however, the same group do not think that it will be socially and economically disruptive such as the Coronavirus pandemic (Alshahrani et al., 2022). Assessment of knowledge among medical professional including occupational physicians, public health professional and general practitioners have reported that twenty-seven (27) percent of 566 participants knew about monkeypox even before that current outbreak of 2022. The same study reported that 82.2% of the sample population acknowledged the European monkeypox cases have been considered as travel-associated cases (Riccò et al., 2022). In contrast, a study conducted in Ohio, United States of America which consists of 197 clinicians in its sample population have revealed that clinician has poor levels of knowledge and 1 in 4 participants have expressed prior knowledge of monkey disease (Bates & Grijalva, 2022). On the level of knowledge of university level students, a study has been concluded that participants – amounting up to five hundred and fifty-eight (558) students – have low level of knowledge in areas of epidemiology, symptoms, and treatment relating to monkeypox which supports the idea of increasing knowledge to enhance the capacity to respond to human monkeypox outbreak (Jairoun et al., 2022).

This study investigates the knowledge and attitudes towards monkeypox among high school students in the Philippines. Understanding the knowledge and attitudes of this population is important for developing effective public health interventions to prevent the spread of monkeypox.

1. LITERATURE REVIEW

1.1 Pathology, Virology and Clinical Features

Genomic sequencing by different monkeypox virus from the United States of America, Western and Central Africa has revealed 2 clades of monkeypox virus. The first clade is endemic to West Africa and the other is endemic to Congo Basin (Central-Africa) (Guarner et al., 2022; Likos et al., 2005; Saied et al., 2022). The Congo Basin clade is known to cause severe disease and infection over the West African clade which has a fatality rate of 10.6%, while the Western African clade accumulated a fatality rate of 3.6% in non-vaccinated individuals (Lansiaux et al., 2022; Velavan & Meyer, 2022). In comparative studies made on genomic level, the West African (WA) and Central African (Congo Basin; CA) clades presents 0.55% to 0.56% nucleotide differences. The CA clades has been revealed to have been possessing 173 unique functional genetic features and 16 truncated open reading frames (ORF) in comparison to the 171 unique functional genetic features, 26 non-functional ORFs, and small remnant of 10 additional ORFs (Chen et al., 2005; Lansiaux et al., 2022). Additionally, both CA and WA clades were revealed to be 99.4% identical while sharing 170 and having insignificant differences in the transcriptional regulatory sequences at the protein level (Chen et al., 2005; Lansiaux et al., 2022; Weaver & Isaacs, 2008).

Monkeypox viral pathogenesis of human monkeypox virus includes the entry of the virus to an individual, virus fusion (entry to the host's cells), replication, and release. This pathogenetic activity of the virus will produce 2 infectious forms – the extracellular enveloped virions (EV) and intracellular mature virions (MV) (Lansiaux et al., 2022). The entry of the virus into the host is through the exposure of the host's oropharyngeal or respiratory mucosa, this is where the site of inoculation occurs in human-to-human. Following the replication of the virus, in case of primary viremia, the viral load reaches the local lymph nodes; however, in secondary viremia, the viral load will spread distant lymph nodes and organs via circulation (Kaler et al., 2022). Vaccines and antibodies that does not produce or target only the extracellular enveloped virions antigen provides decreased level of protection than vaccines that targets both MV and EV (Chen et al., 2005; Golden et al., 2011; Weaver & Isaacs, 2008).

The HMPXV has an estimated incubation period of 5 to 21 days with signs and symptoms that last for 2 to 5 weeks (Petersen et al., 2019). The physical observable feature of human monkeypox virus closely resembles that of smallpox infection, however, for monkeypox infection, the enlargement of lymph nodes at an earlier stage will be a huge distinguishing factor (Sklenovská & Van Ranst, 2018). Additionally, clinical presentation of human monkeypox 5 to 13 days after exposure are characterized by febrile prodrome, chills, headache, muscle pain and body malaise that lasts for 1 to 3 days. These signs and symptoms are concurrently followed by eruption of maculopapular exanthema, a rash that occurs 1 to 4 days after onset (Huhn et al., 2005; Minhaj, 2022). The rash has characteristics of a deep vesicular or pustular skin rash with centrifugal distribution which over time progresses into crusts or scabs 2 to 3 weeks after onset of the infection (Figure 1) (Minhaj, 2022).



Figure 1 The rash associated with human monkeypox virus infection characterised with deep-seated vesicular or pustular skin rash with centrifugal distribution Resource: Minhaj FS, Ogale YP, Whitehill F, et al. Monkeypox Outbreak — Nine States, May 2022

Some recent cases of monkeypox have recorded atypical regions of the body for rash to erupt, which includes lesions in the genital and perianal surface of the body with the absence of febrile or other prodromal symptoms associated with typical monkeypox cases (Minhaj, 2022). The lesions that are observed in this region may conveniently be confused with sexually transmitted infections including herpes virus infections and syphilis (Sampson et al., 2022). Moreover, patients that presented to have coinfections of sexually transmitted infection may lead to difficulty in diagnosing and distinguishing monkeypox infection in an individual (Sampson et al., 2022; Tarín-Vicente et al., 2022).

1.2 Risk Factors and Transmission

This virus came from the family of Poxviridae which are double-stranded DNA viruses that use the host cell's cytoplasm to replicate within the body (Cann et al., 2013). Additionally, the transmission of this virus is through droplet transmission and close skin contact

with the individual infected by the virus, their personal objects, skin lesions, or other bodily fluids. Furthermore, vertical transmission is also a risk of transmission among mothers to their foetus or newly born child (Alshahrani et al., 2022). Moreover, the monkeypox virus is a self-limiting disease that causes symptoms for 2 to 4 weeks upon exposure to the virus. Serious cases of this disease are commonly found on children as it is related to the extent of the exposure to the virus, knowledge on hygiene and disease prevention, and individual's health status (World Health Organization, 2022). It is believed that rodents are the main reservoir animals of this virus, however this has yet to be confirmed by further studies about the virus (Alshahrani et al., 2022).

Several risk factors or risk behaviours for contracting human monkeypox has been revealed, these includes human exposure excretions of infected animals mainly in endemic regions of Africa whereas scarcity of infrastructure and resources are present which causes individuals to sleep outside, lay on the ground, and settle or visit the nearby forest where primary drivers of zoonotic transmission are commonly sighted, ensuing the risk for animal to human transmission (Bunge et al., 2022; Kaler et al., 2022). Furthermore, direct contact and exposure with these zoonotic drivers and its bodily fluids (saliva, excretions from respiratory system of infected animal, and discharge from lesions on cutaneous or mucosal surface) are linked to animal-to-human transmission of HMPXV (Hutson et al., 2009; Kaler et al., 2022). Individuals who participate in hunting small mammals such as bushmeats for obtaining protein-rich food increases the risk of exposure to wild rodents that may carry MPXV (Quiner et al., 2017).

Additionally, living in the same household where sleeping in the same room or bed is common, or sharing the use of dishes and utensils for drinking and eating have been associated with human-to-human transmission (Bunge et al., 2022; Nolen et al., 2015). During the ongoing epidemic of monkeypox, the disease are observed to be more common in males who have sex with males (Kaler et al., 2022; Okyay et al., 2022). However, according to the World Health Organization (WHO), there is no sufficient evidence that monkeypox can be categorised as sexually transmitted disease, but the transmission can be associated to close physical contact with an infected individual (World Health Organization, 2022). Respiratory droplets are considered as the most common mode of human-to-human transmission (Kaler et al., 2022).

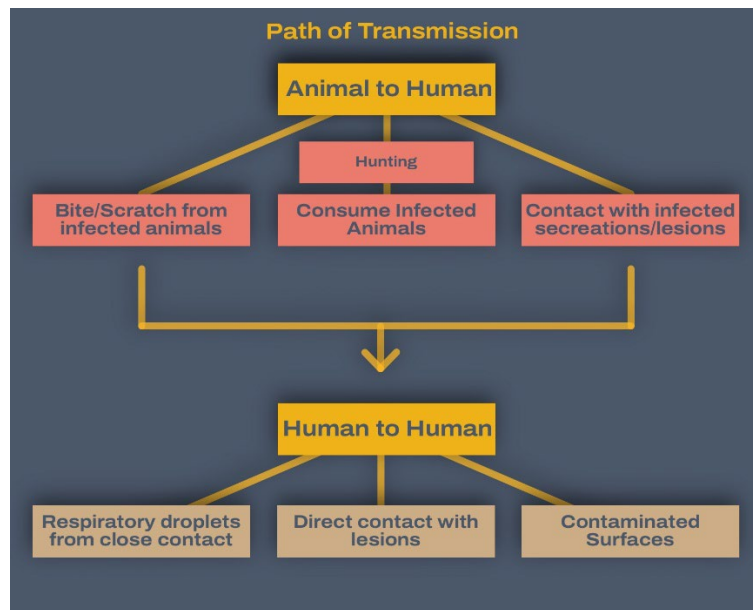


Figure 2 Pathway of Monkeypox transmission from animal to human and human to human ("Monkeypox virus transmission" by ICapt.NemoI is licensed under CC BY-SA 4.0.)

1.3 Diagnostic Management and Treatment

Monkeypox disease presents additional challenges to the public health system, and healthcare workers in relevance to surveillance, hospital and laboratory capacity (Altindis et al., 2022). Data has shown that majority of initial patient who contracted monkeypox has revealed to have travelled internationally 21 days prior to the onset of symptom – travelled to countries where HMPXV is not endemic and have participated in large activities such as festivals where close physical contact can occur. Conversely, travel history does not present confirmation that an infected individual has acquired monkeypox while traveling (Lansiaux et al., 2022).

Clinical manifestation shall be observed when diagnosing a suspected monkeypox case. The first signs and symptoms of HMPXV are non-specific and may present with a viral febrile prodromal phase, which distinguished by headache, body malaise, fatigue, backache, and a high fever occurring 1 to 4 days before the onset of vesiculopapular rash (Cheema et al., 2022; Karbalaeei & Keikha, 2022). The vesiculopapular rash spreads from the face and trunk to the other parts of the body including the palm of the hands and soles of the feet. These rashes go through different stage: macular, popular, vesicular, and pustular lesion. After 1 to 2 weeks, the pustules form crust and later desquamate (Cheema et al., 2022). Prior to, and

during the rash development, the presence of maxillary, cervical, or inguinal lymphadenopathy can be observed (Figure 3) (McCollum & Damon, 2014).



Figure 3 Cervical lymphadenopathy due to active monkeypox case on 1996 to 1997 in Democratic Republic of Congo. Photograph credit: Dr Brian W. J. Mahy; provided by the Public Health Image Library, Centers for Disease Control and Prevention.

The mentioned clinical manifestation and characteristics of human monkeypox virus is used to determine if patients that presents sign and symptom have met epidemiologic criteria and high suspicion monkeypox, and laboratory testing shall be provided to individuals that falls under these clinical and epidemiological criteria of monkeypox (Altindis et al., 2022).

Patients that fall under the aforementioned criteria, monkeypox can be confirmed by polymerase chain reaction (PCR) test, the golden standard for diagnosis and is the first test that should be done according to the testing algorithm (Cheema et al., 2022). After a negative PCR test result, and if infection of monkeypox is still suspected, the tests listed under Table 1 shall be performed (McCollum & Damon, 2014). However, if PCR test result turned out positive for monkeypox infection, testing and tracing of individual who have closed contact with the patient that has a positive PCR test result must be done. Additionally, vaccination of exposed individuals should be implemented, if possible (Cheema et al., 2022).

Type of Tests	Description and Sample Used
PCR	Used for the detection of monkeypox DNA, RT-PCR is known to be the gold standard for diagnosis. Sample used in this test are lesion fluid.
Viral culture	The virus is grown and isolated from a patient sample (lesion fluid)
Anti-orthopoxvirus IgG and IgM tests	Used to reveal recent or remote exposure to Orthopoxvirus, where blood specimen is collected from the patient.
Immunohistochemistry	This test is performed to determine the presence of Orthopoxvirus-specific antigen. The sample necessary for this test is biopsy specimen.
Electron microscopy	Pox virus is morphologically identified with the use of electron microscope, and biopsy specimen, scab material, and vesicular fluid are required to be collected.

Table 1. Diagnostic tests for Monkeypox (DNA, deoxyribonucleic acid; IgG, immunoglobulin G; IgM, immunoglobulin M)

Individuals who have been confirmed to be infected with monkeypox virus requires no medical treatment in order to recover, however patients who presents gastrointestinal symptoms such as vomiting and diarrhoea will require oral or intravenous rehydration to prevent excessive fluid loss. In addition, antivirals may be an effective choice in the treatment of monkeypox infections, this includes Tecovirimat (TPOSS or ST-246) which inhibits the spread of virus within the host infected with monkeypox. Moreover, Brincidofovir and Cidofovir has been approved in the United States as a choice for treatment which works by inhibiting the viral DNA polymerase (Rizk et al., 2022).

1.4 Prevention and Vaccination

Endemic areas are faced with a highly challenging problem on preventing the spread of human monkeypox. It is suggested that contact with rodents and primates together with

limited exposure to blood and uncooked meat are encouraged to prevent infection. However, halting the trade of bushmeat and consumption of wild animals poses difficulty as cultural and economic factors influences this. Additionally, this could be the only feasible source of protein to poor people (Petersen et al., 2019). Avoiding close (skin-to-skin) contact with individuals who presents a rash, and with objects that an individual with monkeypox has used are also a preventive measure to monkeypox along with proper handwashing (Centers for Disease Control and Prevention, 2022c).

Depending on how related the different orthopoxviruses are, the response of the immune system to specific orthopoxvirus can vary in different levels of protection. In addition, after smallpox vaccination has been stopped, monkeypox incidence increase due to a rise of immunologically naïve population. (Poland et al., 2022). During the time when smallpox outbreaks are rampant, there were no monkeypox cases that are being reported. This may have occurred since monkeypox caught more attention, and the clinical features of the two diseases – smallpox and monkeypox – are closely similar or there is a lack of laboratory confirmation of the causative agent which led to assumption of monkeypox (Bunge et al., 2022; Reynolds et al., 2012).

According to the Center for Disease Control and Prevention (2022), those who are at high risk of contracting monkeypox and have access to JYNNEOS vaccine should be vaccinated. This vaccine is approved for prevention of smallpox and monkeypox (Centers for Disease Control and Prevention, 2022d).

1.5 Current outbreak around the world and in the Philippines

There have been 86,231 confirmed cases of human monkeypox identified across the globe -- 84,858 of these cases originated from 103 nations that do not have a history of establishing reports of monkeypox in the past (Centers for Disease Control and Prevention, 2023a). According to the Department of Health (2022), as of September 2022, there have been a total of four (4) current cases of this disease that have been recorded in the Philippines (Department of Health, 2022).

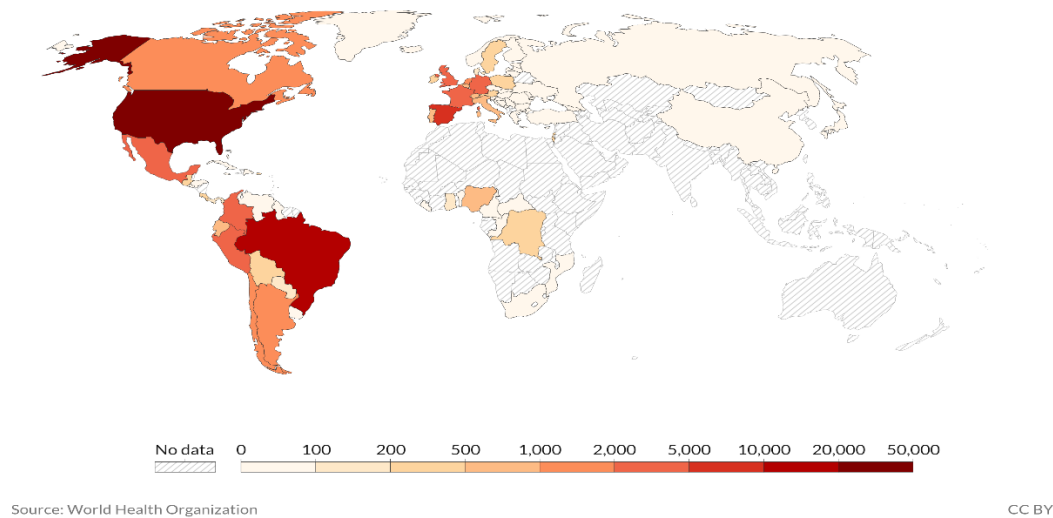


Figure 4 Cumulative cases of Monkeypox visualized in world map as of 8 March 2023. Resource: Mpox (monkeypox) by Edouard Mathieu, Fiona Spooner, Saloni Dattani, Hannah Ritchie and Max Roser (Mathieu et al., 2022)

1.6 Knowledge level on human monkeypox

Recent study assessing the knowledge of monkeypox in the general population in Saudi Arabia have shown that the large percentage of participants were aware of the infectious disease that the monkeypox virus presents. Additionally, monkeypox outbreak was not seen as a form of conspiracy or an act of bioterrorism. According to Alshahrani et al., (2022), seventy (70) percent of the participants knew that the virus is contagious, however, the same group do not think that it will be socially and economically disruptive such as the Coronavirus pandemic (Alshahrani et al., 2022). Assessment of knowledge among medical professional including occupational physicians, public health professional and general practitioners have reported that twenty-seven (27) percent of 566 participants knew about monkeypox even before that current outbreak of 2022. The same study reported that 82.2% of the sample population acknowledged the European monkeypox cases have been considered as travel-associated cases (Riccò et al., 2022). In contrast, a study conducted in Ohio, United States of America which consists of 197 clinicians in its sample population have revealed that clinician has poor levels of knowledge and 1 in 4 participants have expressed prior knowledge of monkey disease (Bates & Grijalva, 2022). On the level of knowledge of university level students, a study

has been concluded that participants – amounting up to five hundred and fifty-eight (558) students – have low level of knowledge in areas of epidemiology, symptoms, and treatment relating to monkeypox which supports the idea of increasing knowledge to enhance the capacity to respond to human monkeypox outbreak (Jairoun et al., 2022).

OBJECTIVES

The problem being addressed by this research is the lack of data about the knowledge and attitude of school-age children in the Philippines, which is a precondition on how the public healthcare system will write the structure of policies on pandemic response if this disease goes widespread in the country. The importance of this study is irrefutable as a crucial data collected during data collection is used to determine the areas where population is lacking in the aspect of knowledge about the monkeypox disease. This research aims to: determine the extent of knowledge of high school student in the Philippines on the essential information and preventive methods against human monkeypox (MPX), identify the possible factors influencing the amount of knowledge on human monkeypox (MPX) among high school students, and assess the attitude of high school students towards the current problem caused by human monkeypox (MPX).

In this study, the researcher aims to answer the following research questions:

- What is the knowledge level of the high school students towards monkeypox?
- What are the variables that affect students' knowledge about the monkeypox disease?
- What attitudes are presented by high school students towards monkeypox?
- What are the variables that affect students' attitude?

The research paper establishes data on the knowledge level and attitude on monkeypox virus in the Philippines. The researcher has formed the following hypothesis to be tested:

- There is no significant association between knowledge level and different variables.
- There is significant association between knowledge level and different variables.
- There is no significant association between knowledge level and the education level of the parents.
- There is a significant association between knowledge level and the education level of the parents.

MATERIALS AND METHODS

4.1 Subject and Study Setting

The researcher selected Santo Rosario National High School in the municipality of Santo Domingo, Nueva Ecija, Philippines as a study setting of this research to conduct data collection. The selected school consists of eight hundred fifteen (815) students from 7th to 12th Grade level. Out of 815 of its student population, six hundred sixty (660) student were randomly selected to be a part of the sample population which consists of one hundred three (103) 7th grade students, one hundred ten (110) 8th grade students, one hundred forty eight (148) 9th grade students, one hundred fourteen (114) 10th grade student, one hundred eleven (111) 11th grade student and seventy four (74) 12th grade students.

4.2 Data Collection

Data collection was conducted last December 2022. The researcher gathered the following information: (1) socio-demographic and economic profile, (2) knowledge about monkeypox, and (3) attitude towards monkeypox among high school students. The socio-demographic profile and economic profile consists of questions about age, sex, marital status, nationality, residency, educational level, employment status, family monthly income (in Philippine peso), vaccination history, and highest level of education reached by their parents. Knowledge about monkeypox section of the questionnaire measure the basic knowledge of the students about the history, transmission and prevention of monkeypox. Lastly, the last section of the questionnaire consists of statements about the attitude of high school students towards monkeypox, this is presented in a Likert-scale format.

4.3. Questionnaire

With permission from the author, the questionnaire that was used for this study was adapted from (Alshahrani et al., 2022) “Assessment of Knowledge of Monkeypox Viral Infection among the General Population in Saudi Arabia”.. The researcher modified sections of the questionnaire to adapt the Philippine context. The

questionnaire was modified into 10 item basic knowledge questionnaire and 9 item attitude questionnaires (Appendix 1).

Questions that have been answered correctly according to latest knowledge about monkeypox are given 1 point per correct answer, and those items that was answered incorrectly or 'I do not know' are given 0 points. For the section of the questionnaire that measures the attitude of the participants, the student was asked to encircle the response that best characterizes how they feel about the corresponding statements through a Likert Scale format.

4.3 Data Analysis

In this study, the researchers employed STATA 13 software, a widely used statistical analysis tool, to conduct the necessary statistical analyses (StataCorp, 2013). Knowledge score was categorized into two distinct groups: low and high. The mean score of the knowledge assessment was utilized as the cut-off point to determine these categories. The students who achieved cumulative scores higher than the cut-off point were categorized as having a higher knowledge level, while those who obtained cumulative scores that is lower than the cut-off point were classified as having lower knowledge level.

By using the mean score as the threshold of categorization, the researchers aimed to design a clear distinction between students with relatively higher level of knowledge and those who exhibited a lower level of knowledge about monkeypox. This allowed simplified analysis, making it easier to compare knowledge levels of students across two distinct categories. This categorization can provide insights into the distribution of knowledge levels within the studied population and facilitate statistical examinations of the relationship between knowledge scores and different variables. Multiple logistic regression was used to analyse the relationship between knowledge score and different variables facilitating the determination of statistically significant factors effecting the students' scores.

RESULTS

5.1 Socio-demographic and economic background of the respondents

Of the 821 students at Santo Rosario National High School, 691 students across all grade level (Grade 7, Grade 8, Grade 9, Grade 10, Grade 11, and Grade 12) were randomly selected to answer the questionnaire.

The result of the data collection has revealed that the highest distribution of students is aged 12 to 17 years old. Few students who are in their 20s are those who returned to school at a later age. Moreover, the number of male and female respondents is relatively equal, with 356 male respondents and 335 female respondents. A huge majority of respondents reside in rural areas, equating to 690 respondents. It was observed that the highest percentage of respondents came from the 9th grade, claiming 22%, while the lowest came from the 12th grade at 9.70%.

It was observed that significant number of students 616(89.1%) have a family monthly income ranging from 0 to 25,000 Philippine Pesos, 72(10.4%) and 3(0.4%) of students have family income ranging from 25,001 to 50,000 and 50,001 to 75,000 Philippines Pesos, respectively. The highest level of student's father and mother were also collected. The majority of both father and mother's highest education falls under high school level of below with 555(80.3%) and 584(84.5%). While those who have undergraduate or bachelor's degree are relatively equal with 65(9.4%) and 58(8.4%) for father and mother. In addition, the Table 4 shows that 71(10.3%) and 49(7.1%) of student's parents, father and mother, have reached graduate and post-graduate degrees.

Variables		N (%)
Age	<18	674(97.5%)
	>18	17(2.5%)
Sex	Male	356(51.5%)
	Female	335(48.5)

Marital Status	Single	691(100%)
Nationality	Filipino	691(100%)
Place of Residency	Rural	690(99.9%)
	Urban	1(0.1%)
High School Grade Level	Junior High School (7 th – 10 th Grade	486(70.3%)
	Senior High School (11 th – 12 th Grade)	205(29.7%)
Job Status	Yes	687(99.4%)
	No	4(0.6%)
Family Monthly Income	0 – 25,000	616(89.1%)
	25,001 – 50,000	72(10.4%)
	50,001 – 75,000	3(0.4%)
	>75,000	0
Vaccination History	Complete COVID-19 vaccine shots (2 or more shots)	576(83.4%)
	Complete childhood vaccination	689(99.7%)
Mother's Highest Level of Education	Highschool and below	555(80.3%)
	Undergraduate or bachelor's degree	65(9.4%)
	Graduate and Post-graduate degree	71(10.3%)
Father's Highest Level of Education	Highschool and below	584(84.5%)
	Undergraduate or bachelor's degree	58(8.4%)
	Graduate and Post-graduate degree	49(7.1%)

Table 2. Socio-demographics and economic characteristics of the study respondents (N=691)

5.2. Knowledge Level of Students

Statistical analyses have shown that the majority of the students have accumulated score from 3 to 6 points, with very small number of students have scored perfect 9 and 10 points – 2 and 1 students, respectively (Figure 5).

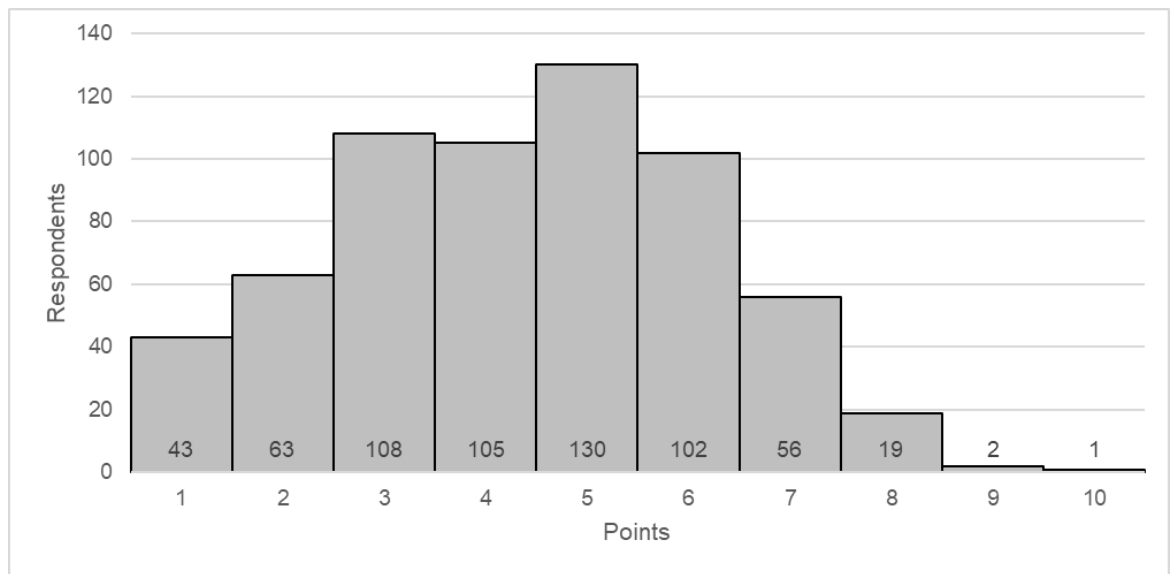


Figure 5 Graph of students and their corresponding accumulated knowledge scores

Moreover, 10 questions were presented to the respondents to determine their level of basic knowledge in monkeypox disease. Figure 6 demonstrates the proportion of good answers among high school students based on the basic knowledge questions presented in the questionnaire. Around 67% ($n = 463$) of 691 student sample population knows that the disease is do not only affects male but also female individuals. The use of hand sanitizers and face masks as an important tool in preventing monkeypox is known by 62% ($n = 429$) respondent. Moreover, most knew that skin rash is one of the symptoms of monkeypox (60%, $n = 413$). Out of all participants, almost half of the respondents (52%, $n = 359$) knows that the first symptoms of monkeypox are similar to the flu. Though 47% ($n = 326$) knew that monkeypox is spread by droplets such as coughing and sneezing, only 32% ($n = 220$) knew that the same disease is spread through bodily fluids. Around 23% ($n = 162$) have the knowledge that existing smallpox vaccine can be used for monkeypox, however only 22% ($n = 153$) of the respondents correctly responded to the question if monkeypox vaccine is available in the Philippines. Furthermore, less (22%, $n = 152$) knew that chickenpox vaccine in childhood do not protect against monkeypox. Lastly, very few respondents have the knowledge that there are no special treatments against monkeypox accounting only 12% ($n = 83$) on proportion of good answers.

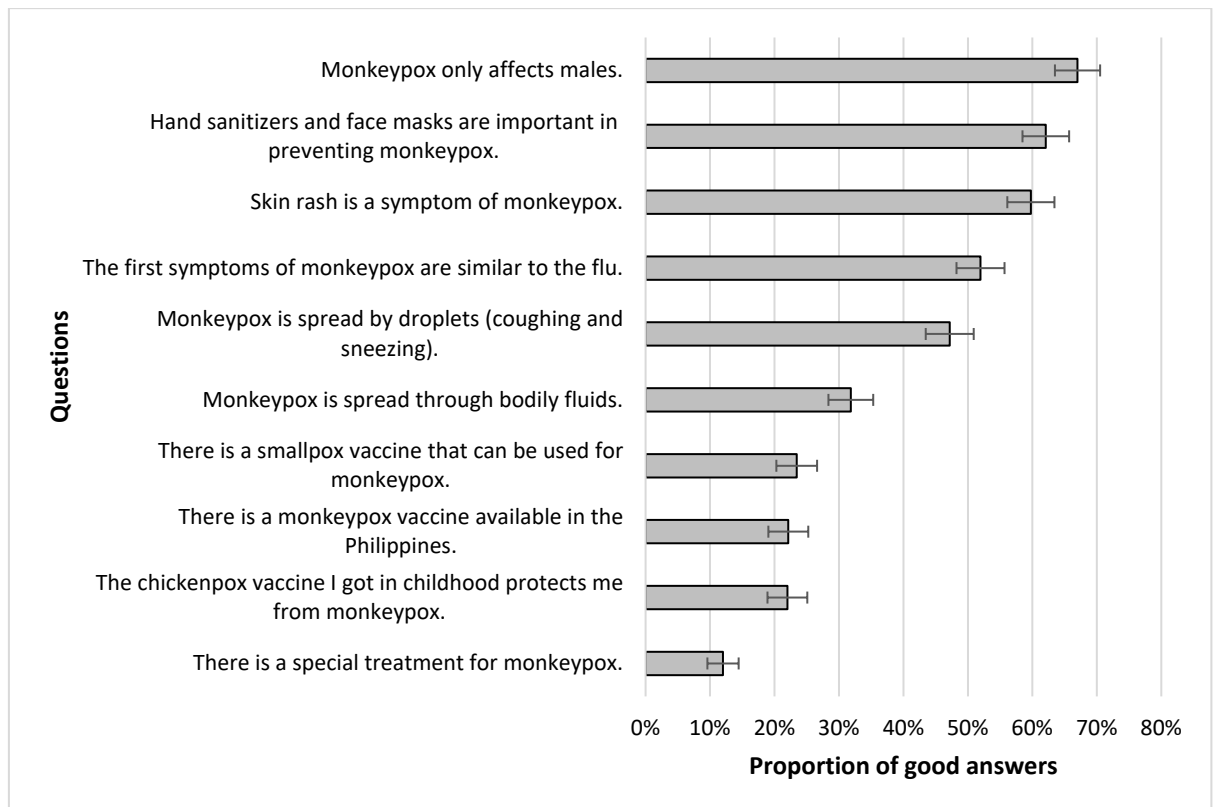


Figure 6 Proportion of good answers in basic knowledge test among high school students

5.3. Attitude among high school students

The attitudes of high school students towards human monkeypox disease are presented in Table 3. More than half of the sample population agreed monkeypox could be transmitted to the Philippines (53.12%), that traveling to monkeypox virus infected countries is risky (69.18%), that the global population is capable to control the monkeypox epidemic (60.49%), concurrently, 53.11% of the respondents agreed that monkeypox prevention and control measure are adequately available. Consequently, only thirds (33,14%) of the high school students have negative feeling about monkeypox virus, and 41.82% have agreed that monkeypox disease adds additional strain on the health care systems of the affected countries. Nearly half of the respondents have agreed that monkeypox will become a pandemic like the COVID-19 (46.60%).A huge number of respondents had agreed that media coverage of monkeypox virus may have an impact on its global prevention (57.39%), and that would like to learn more about the epidemiology of new emerging diseases (63.24%).

Table 3 Attitudes about monkeypox among high school students (N = 691)

Statements (Mga Pahayag)	Attitude towards Monkeypox		
	Disagree N (%)	No opinion N (%)	Agree N (%)
I am sure that the global population will be able to control the monkeypox virus epidemic. <i>(Sigurado ako na makokontrol ng pandaigdigang populasyon ang epidemya ng monkeypox virus.)</i>	109 (15.77%)	164 (23.73%)	418 (60.49%)
I believe that monkeypox virus prevention and control measures are adequately available. <i>(Naniniwala ako na ang mga hakbang sa pag-iwas at pagkontrol ng monkeypox virus ay sapat na magagamit.)</i>	158 (22.87%)	166 (24.02%)	367 (53.11%)
I have negative feelings about the monkeypox virus. <i>(Mayroon akong negatibong damdamin tungkol sa monkeypox virus.)</i>	235 (34.01%)	227 (32.85%)	229 (33.14%)
I believe that monkeypox virus adds additional strain on the healthcare systems of the affected countries. <i>(Naniniwala ako na ang monkeypox virus ay nagdaragdag ng karagdagang strain sa mga sistema ng pangangalagang pangkalusugan ng mga apektadong bansa.)</i>	204 (29.52%)	198 (28.65%)	289 (41.82%)
I think that monkeypox virus can be transmitted to the Philippines. <i>(Sa tingin ko, ang monkeypox virus ay maaaring maipasa sa Pilipinas.)</i>	201 (29.09%)	116 (16.79%)	374 (54.12%)
I believe that media coverage of monkeypox virus may have an impact on its global prevention. <i>(Naniniwala ako na ang media coverage ng monkeypox virus ay maaaring magkaroon ng epekto sa pandaigdigang pag-iwas nito.)</i>	126 (18.26%)	168 (24.35%)	396 (57.39%)

I think monkeypox virus will become a new pandemic, and its impact will be like COVID-19. (Sa tingin ko ang monkeypox virus ay magiging isang bagong pandemya, at ang epekto nito ay magiging tulad ng COVID-19.)	221 (31.98%)	148 (21.42%)	322 (46.60%)
I would like to learn more about the epidemiology of new emerging diseases. (Gusto kong matuto nang higit pa tungkol sa epidemiology ng mga bagong umuusbong na sakit.)	123 (17.80%)	131 (18.96%)	437 (63.24%)
I believe that traveling to monkeypox virus infected countries is risky. (Naniniwala ako na ang paglalakbay sa mga bansang nahawaan ng monkeypox virus ay delikado.)	104 (15.05%)	109 (15.77%)	478 (69.18%)

5.4. Factors affecting the knowledge level

The data collected was analyzed through multiple logistic regression and results are presented in Table 3. It has been found that female respondents had 9% lower odds (OR = 0.91) to reach the median knowledge compared to male respondents, but not significant ($p = 0.588$). When it comes to grade level of the respondents, data shows that as the grade level increases there is a continuous and significant ($p = 0.039$) decrease by 11% off (OR = 0.89) of having at least median knowledge. For students who had complete childhood and COVID-19 vaccine, there is more than 1 times higher odd (OR = 1.44) of reaching the median knowledge score, but it does not show statistical significance ($p = 0.094$). Additionally, students whose mother has an undergraduate or bachelor's degree have the low odds of 0.92 times of reaching the median knowledge score, but this is not statistically significant as shown by the resulting p-value ($p = 0.815$). This is also observed for students whose mother has a graduate or post-graduate degree with low odds of 0.81 and it does not indicate statistical significance ($p = 0.559$). For students whose father has an undergraduate degree, their odds of reaching the median score is low (OR = 0.72) which is also not statistically significant ($p = 0.358$). Moreover, students who father

has a graduate or post-graduate degree, their odds are slightly higher (OR = 0.85), however the p-value ($p = 0.686$) shows no significance.

Knowledge Level on Human Monkeypox		
Variables	Odds Ratio	P-value
Gender	0.91	0.588
Grade Level	0.89	0.039*
Covid Vaccination	1.45	0.094
Mother's Level of Education		
- Undergraduate degree	0.92	0.815
- Graduate or Post-graduate degree	0.81	0.559
Father's Level of Education		
- Undergraduate degree	0.73	0.358
- Graduate or Post-graduate degree	0.85	0.686

Table 4. Multiple logistic regression of knowledge level and different variables, * Statistically significant p -value ≤ 0.05

On the other hand, the students' attitude where taken into account (Table 4). Those who responded that they believe that monkeypox virus prevention and control measure are adequately available has 2 times higher odds to reach at least median knowledge compared to people who disagreed with the statement significantly ($p < 0.001$). Moreover, it has been observed to students who have negative feelings about the monkeypox disease, having more than 2 times higher odds to have obtain median knowledge scores compared to students that disagreed with the statement significantly ($p < 0.001$). Additionally, students who believe that monkeypox can travel to the Philippines has 1 times higher odds (OR = 1.52) to reach the median knowledge score than students who disagreed with the statement significantly ($p = 0.020$). Students who believe that monkeypox adds additional burden to the healthcare system has 1 more time higher odds (OR = 1.18) of obtaining at least the median knowledge score than those students who disagrees, but higher p -value show no statistical significance ($p = 0.338$), while those students who agreed that media coverage of monkeypox may have an impact on its global prevention has been found to have 1 times higher odds (OR = 1.16) to reach the median score compared to those who disagreed, however this has no statistical significance ($p = 0.385$). Concurrently, students who think that monkeypox will become a new pandemic and will have the same impact as COVID-19 has been observed to have 1 times higher odds (OR =

1.03) in comparison to students to disagreed, but not significant ($p = 0.867$). Students who express that they would like to learn more about epidemiology of new emerging diseases has lower odds ($OR = 0.89$) of obtain median knowledge score and showing no significant difference than students who disagreed ($p = 0.553$), while those who believe that travelling to monkeypox infected country is risky has low odds ($OR = 0.93$) of having scores reaching at least the median knowledge, however high p-value show no statistically significant difference in comparison wot students who disagreed with the statement ($p = 0.755$). Lastly, the students who agreed with the statement that the global population will be able to control the monkeypox virus epidemic had lower odds ($OR = 0.83$) of reaching the median knowledge scores compared to students who disagreed, but not significantly ($p = 0.324$).

Attitudes towards Human Monkeypox		
Statements	Odds Ratio	P-value
I am sure that the global population will be able to control the monkeypox virus epidemic.	0.84	0.324
I believe that monkeypox virus prevention and control measures are adequately available.	1.99	0.000*
I have negative feelings about the monkeypox virus.	2.25	0.000*
I believe that monkeypox virus adds additional strain on the healthcare systems of the affected countries.	1.19	0.338
I think that monkeypox virus can be transmitted to the Philippines.	1.53	0.020*
I believe that media coverage of monkeypox virus may have an impact on its global prevention.	1.17	0.385
I think monkeypox virus will become a new pandemic, and its impact will be like COVID-19.	1.03	0.867

I would like to learn more about the epidemiology of new emerging diseases	0.89	0.553
I believe that traveling to monkeypox virus infected countries is risky.	0.93	0.755

Table 5. Multiple logistic regression of knowledge and attitude towards human monkeypox, * Statistically significant p-value ≤ 0.05

DISCUSSION

The current monkeypox outbreak around the world poses a new challenge in the health care system in affected countries. As cases increase, along with the opening of schools in the Philippines which were closed during the COVID-19 pandemic, the public and specifically students, should have enough knowledge on symptoms and prevention of the spread of monkeypox disease. The assessment of knowledge and attitude among high school students in the Philippines will assist in determining the knowledge gaps of students which determines the information that the health authorities such as the Department of Health should focus in disseminating important facts about this disease – signs and symptoms, prevention and control, and surveillance. This influences the success of containment of the disease. Hence, this study assessed the knowledge and attitude towards human monkeypox among high school students in the Philippines.

The results revealed that the students had a poor knowledge level on monkeypox. Moreover, results shown that there was no correlation between knowledge level and different variables such as gender, mother and father's highest level of education, and vaccination history. The Philippines is not included in the list of countries where monkeypox disease is endemic, and this might have influenced the knowledge score of majorities of students. This is supported by studies that assessed the knowledge level of certain part of populations on endemic and non-endemic disease in a country which reported higher knowledge level on endemic diseases than non-endemic diseases (Alshahrani et al., 2022; Harapan et al., 2020).

More than half of the population knew that monkeypox disease can be contracted by all sexes and are not isolated to men. One of the preventive measure for monkeypox disease is proper handwashing and wearing of face masks (Centers for Disease Control and Prevention, 2022b). Around 62% of the respondents knew

that proper hand hygiene and wearing face masks are tools that help in the prevention of this disease. Moreover, several studies have mentioned that one of the most common symptoms of monkeypox are similar to flu, and skin rashes (Khattak et al., 2023; Luo & Han, 2022; Wise, 2022). Of all respondents, 60% knew that skin rashes are one of the symptoms, and more than half (52%) knew that the clinical symptoms of monkeypox is similar to flu.

On the other hand, almost half (47%) of the students are aware that the virus spreads by droplets such as coughing and sneezing, however, only 32% knew that bodily fluids also spread through contact with bodily fluid of infected individuals. According current epidemiological information, the primary drivers of human-to-human transmission is through contact with respiratory droplets and, contact with bodily fluids which includes urine, saliva, faeces, and semen which suggests that one of the major drivers of transmission are sexual contacts with infected individuals (Alakunle et al., 2020; Moore et al., 2022; Peiró-Mestres et al., 2022). Lower percentage of students have the knowledge on smallpox vaccine being used for monkeypox disease prevention (22%), while even lower number of respondents (153) knows about vaccine availability in the Philippines. According to recent studies, smallpox vaccines, including JYNNEOSTM (also known as IMVAMUNE, IMVANEX, MVA-BN), ACAM2000®, Aventis Pasteur Smallpox Vaccine (APSV) may provide protective effect against monkeypox virus, and improve the observed symptoms of this disease (Rizk et al., 2022). Furthermore, the 22% of the respondent knew that vaccines against chickenpox is not effective in providing protection against the monkeypox virus. Also, even fewer (12%) respondents have the knowledge that there is no current available treatment for monkeypox. Currently, according to the Center for Disease Control and Prevention (CDC), there are no specific treatment for monkeypox virus afflicted patients, and supportive care are sufficient (Centers for Disease Control and Prevention, 2023b).

With regards to the current public health policies, the finding from this study could be considered to have a significant potential to the public health policies written my Department of Health in the Philippines.

In terms of the attitudes presented by high school students in the Philippines, the sample population agreed that monkeypox could be transmitted to the

Philippines, that traveling to infected countries is risky, that the global population is capable of controlling the epidemic, that prevention and control measures are adequately available, that monkeypox disease adds additional strain on health care systems, and that monkeypox will become a pandemic like COVID-19. Additionally, they agreed that media coverage of monkeypox virus may have an impact on its global prevention, and that they would like to learn more about the epidemiology of new emerging diseases.

Following these results, the findings of the logistic regression analysis reject the null hypothesis, indicating that there is a significant association between knowledge levels and various variables. Notably, grade level, and attitudes towards monkeypox prevention demonstrate statistically significant relationships with knowledge levels among the study participants. The results support the hypothesis that there is a significant association between knowledge levels and different variables. Logistic regression analyses reveal significant relationships with key factors such as grade level, and attitudes, highlighting the multifaceted nature of the influences on knowledge levels among the participants. Contrary to the hypothesis, the logistic regression analysis fails to establish a statistically significant association between parental education levels and students' knowledge levels. These results suggest that parental education, in isolation, may not be a significant predictor of students' knowledge in the studied context. The hypothesis proposing a significant association between knowledge levels and the education level of parents is not supported by the analysis. Logistic regression results do not indicate a statistically significant relationship between parental education levels and the knowledge levels of students.

CONCLUSION

This study has assessed the knowledge level and attitudes of 691 high school students towards human monkeypox disease. Students have low knowledge on basic information about monkeypox. Moreover, the majority of the high school students have presented positive attitude towards learning more information about this subject and that media coverage have a huge impact in the prevention of monkeypox infections. Factors such as having complete childhood and COVID-19 vaccinations has higher odds of having median knowledge level. This was also observed for students who believe that there is adequate virus prevention and control measure, who negative feelings about monkeypox, that the monkeypox virus can travel to the Philippines. Female respondents showed slightly lower odds of reaching median knowledge compared to males, but this difference was not statistically significant. However, grade level was significantly associated with knowledge, with higher grades correlating with lower odds of having median knowledge. While some attitudes, such as belief in the availability of prevention measures and negative feelings about the disease, were strongly associated with higher odds of obtaining median knowledge. Overall, these findings provide valuable insights into the factors that may affect knowledge levels about monkeypox among students.

Given these results, the study concludes that information drive educating the population of the facts about monkeypox are recommended in increasing awareness on this disease and its prevention.

ACKNOWLEDGEMENT

I would like to thank my supervisors, Ms. Anita Barth, and Mr. Gergő József Szöllősi, for their unconditional support and professional insights throughout the completion of the study.

Expression of personal gratitude are also extended to Mrs. Emelie Ambrocio and Mr. Danilo Ambrocio for their continued encouragement, unconditional love, and belief in me. I would like to acknowledge my family for their love, understanding, and patience throughout this endeavor. Their unwavering support and encouragement have been a constant source of motivation for me.

I am truly fortunate to have such an incredible network of individuals who have played a significant role in my research. Without your support and encouragement, this study would not have been possible. Thank you all for being a part of this journey and for enriching my life in so many ways.

REFERENCES

- Alakunle, E., Moens, U., Nchinda, G., & Okeke, M. I. (2020). Monkeypox Virus in Nigeria: Infection Biology, Epidemiology, and Evolution. *Viruses*, *12*(11), 1257. <https://doi.org/10.3390/v12111257>
- Alshahrani, N. Z., Alzahrani, F., Alarifi, A. M., Algethami, M. R., Alhumam, M. N., Ayied, H. A. M., Awan, A. Z., Almutairi, A. F., Bamakhrama, S. A., Almushari, B. S., & Sah, R. (2022). Assessment of Knowledge of Monkeypox Viral Infection among the General Population in Saudi Arabia. *Pathogens (Basel, Switzerland)*, *11*(8), 904. <https://doi.org/10.3390/pathogens11080904>
- Altindis, M., Puca, E., & Shapo, L. (2022). Diagnosis of monkeypox virus – An overview. *Travel Medicine and Infectious Disease*, *50*, 102459. <https://doi.org/10.1016/j.tmaid.2022.102459>
- Bates, B. R., & Grijalva, M. J. (2022). Knowledge, attitudes, and practices towards monkeypox during the 2022 outbreak: An online cross-sectional survey among clinicians in Ohio, USA. *Journal of Infection and Public Health*, *15*(12), 1459–1465. <https://doi.org/10.1016/j.jiph.2022.11.004>
- Bryer, J., Freeman, E. E., & Rosenbach, M. (2022). Monkeypox emerges on a global scale: A historical review and dermatologic primer. *Journal of the American Academy of Dermatology*, *87*(5), 1069–1074. <https://doi.org/10.1016/j.jaad.2022.07.007>
- Bunge, E. M., Hoet, B., Chen, L., Lienert, F., Weidenthaler, H., Baer, L. R., & Steffen, R. (2022). The changing epidemiology of human monkeypox—A potential threat? A systematic review. *PLOS Neglected Tropical Diseases*, *16*(2), e0010141. <https://doi.org/10.1371/journal.pntd.0010141>

- Cann, J. A., Jahrling, P. B., Hensley, L. E., & Wahl-Jensen, V. (2013). Comparative Pathology of Smallpox and Monkeypox in Man and Macaques. *Journal of Comparative Pathology*, 148(1), 6–21. <https://doi.org/10.1016/j.jcpa.2012.06.007>
- Centers for Disease Control and Prevention. (2022a, June 6). *Past U.S. Cases & Outbreaks*. Centers for Disease Control and Prevention. <https://www.cdc.gov/poxvirus/monkeypox/outbreak/us-outbreaks.html>
- Centers for Disease Control and Prevention. (2022b, August 11). *Mpox in the U.S.* Centers for Disease Control and Prevention. <https://t.cdc.gov/K6XB9>
- Centers for Disease Control and Prevention. (2022c, October 31). *Protect Yourself*. Centers for Disease Control and Prevention. <https://www.cdc.gov/poxvirus/monkeypox/prevention/protect-yourself.html>
- Centers for Disease Control and Prevention. (2022d, December 22). *JYNNEOS Interim Guidance*. Centers for Disease Control and Prevention. <https://www.cdc.gov/poxvirus/monkeypox/interim-considerations/jynneos-vaccine.html>
- Centers for Disease Control and Prevention. (2023a, January 26). *2022 Global Map & Case Count*. Centers for Disease Control and Prevention. <https://www.cdc.gov/poxvirus/monkeypox/response/2022/world-map.html>
- Centers for Disease Control and Prevention. (2023b, March 3). *Monkeypox—Clinical Treatment*. Centers for Disease Control and Prevention. <https://www.cdc.gov/poxvirus/mpox/clinicians/treatment.html>
- Cheema, A. Y., Ogedegbe, O. J., Munir, M., Alugba, G., Ojo, T. K., Cheema, A. Y., Ogedegbe, O. J., Munir, M., Alugba, G., & Ojo, T. K. (2022). Monkeypox: A

- Review of Clinical Features, Diagnosis, and Treatment. *Cureus Journal of Medical Science*, 14(7). <https://doi.org/10.7759/cureus.26756>
- Chen, N., Li, G., Liszewski, M. K., Atkinson, J. P., Jahrling, P. B., Feng, Z., Schriewer, J., Buck, C., Wang, C., Lefkowitz, E. J., Esposito, J. J., Harms, T., Damon, I. K., Roper, R. L., Upton, C., & Buller, R. M. L. (2005). Virulence differences between monkeypox virus isolates from West Africa and the Congo basin. *Virology*, 340(1), 46–63. <https://doi.org/10.1016/j.virol.2005.05.030>
- Department of Health. (2022, August 19). *DOH DETECTS, ISOLATES SECOND AND THIRD CONFIRMED CASES OF MONKEYPOX IN THE PHILIPPINES* | Department of Health website. <https://doh.gov.ph/press-release/DOH-DETECTS-ISOLATES-SECOND-AND-THIRD-CONFIRMED-CASES-OF-MONKEYPOX-IN-THE-PHILIPPINES>
- Gessain, A., Nakoune, E., & Yazdanpanah, Y. (2022). Monkeypox. *New England Journal of Medicine*, 387(19), 1783–1793. <https://doi.org/10.1056/NEJMra2208860>
- Golden, J. W., Zaitseva, M., Kapnick, S., Fisher, R. W., Mikolajczyk, M. G., Ballantyne, J., Golding, H., & Hooper, J. W. (2011). Polyclonal antibody cocktails generated using DNA vaccine technology protect in murine models of orthopoxvirus disease. *Virology Journal*, 8(1), 441. <https://doi.org/10.1186/1743-422X-8-441>
- Guarner, J., del Rio, C., & Malani, P. N. (2022). Monkeypox in 2022—What Clinicians Need to Know. *JAMA*, 328(2), 139–140. <https://doi.org/10.1001/jama.2022.10802>
- Harapan, H., Setiawan, A. M., Yufika, A., Anwar, S., Wahyuni, S., Asrizal, F. W., Sufri, M. R., Putra, R. P., Wijayanti, N. P., Salwiyadi, S., Maulana, R., Khusna, A., Nusrina, I., Shidiq, M., Fitriani, D., Muharrir, M., Husna, C. A., Yusri, F.,

- Maulana, R., ... Mudatsir, M. (2020). Knowledge of human monkeypox viral infection among general practitioners: A cross-sectional study in Indonesia. *Pathogens and Global Health*, 114(2), 68–75.
<https://doi.org/10.1080/20477724.2020.1743037>
- Huhn, G. D., Bauer, A. M., Yorita, K., Graham, M. B., Sejvar, J., Likos, A., Damon, I. K., Reynolds, M. G., & Kuehnert, M. J. (2005). Clinical Characteristics of Human Monkeypox, and Risk Factors for Severe Disease. *Clinical Infectious Diseases*, 41(12), 1742–1751. <https://doi.org/10.1086/498115>
- Jairoun, A. A., Al-Hemyari, S. S., Abdulla, N. M., El-Dahiyat, F., Shahwan, M., Hassan, N., Jairoun, O., Alyousef, N. G., Sharif, S., & Jaber, A. A. S. (2022). Awareness and preparedness of human monkeypox outbreak among university student: Time to worry or one to ignore? *Journal of Infection and Public Health*, 15(10), 1065–1071. <https://doi.org/10.1016/j.jiph.2022.08.015>
- Kaler, J., Hussain, A., Flores, G., Kheiri, S., Desrosiers, D., Kaler, J., Hussain, A., Flores, G., Kheiri, S., & Desrosiers, D. (2022). Monkeypox: A Comprehensive Review of Transmission, Pathogenesis, and Manifestation. *Cureus Journal of Medical Science*, 14(7). <https://doi.org/10.7759/cureus.26531>
- Karbalaei, M., & Keikha, M. (2022). Human monkeypox coinfections; lessons from available cases – Correspondence. *International Journal of Surgery*, 104, 106734. <https://doi.org/10.1016/j.ijssu.2022.106734>
- Khattak, S., Rauf, M. A., Ali, Y., Yousaf, M. T., Liu, Z., Wu, D.-D., & Ji, X.-Y. (2023). The monkeypox diagnosis, treatments and prevention: A review. *Frontiers in Cellular and Infection Microbiology*, 12.
<https://www.frontiersin.org/articles/10.3389/fcimb.2022.1088471>

- Lansiaux, E., Jain, N., Laivacuma, S., & Reinis, A. (2022). The virology of human monkeypox virus (hMPXV): A brief overview. *Virus Research*, 322, 198932. <https://doi.org/10.1016/j.virusres.2022.198932>
- Likos, A. M., Sammons, S. A., Olson, V. A., Frace, A. M., Li, Y., Olsen-Rasmussen, M., Davidson, W., Galloway, R., Khristova, M. L., Reynolds, M. G., Zhao, H., Carroll, D. S., Curns, A., Formenty, P., Esposito, J. J., Regnery, R. L., & Damon, I. K. (2005). A tale of two clades: Monkeypox viruses. *Journal of General Virology*, 86(10), 2661–2672. <https://doi.org/10.1099/vir.0.81215-0>
- Luo, Q., & Han, J. (2022). Preparedness for a monkeypox outbreak. *Infectious Medicine*, 1(2), 124–134. <https://doi.org/10.1016/j.imj.2022.07.001>
- Mathieu, E., Spooner, F., Dattani, S., Ritchie, H., & Roser, M. (2022). Mpox (monkeypox). *Our World in Data*. <https://ourworldindata.org/monkeypox>
- McCollum, A. M., & Damon, I. K. (2014). Human Monkeypox. *Clinical Infectious Diseases*, 58(2), 260–267. <https://doi.org/10.1093/cid/cit703>
- Minhaj, F. S. (2022). Monkeypox Outbreak—Nine States, May 2022. *MMWR. Morbidity and Mortality Weekly Report*, 71. <https://doi.org/10.15585/mmwr.mm7123e1>
- Moore, M. J., Rathish, B., & Zahra, F. (2022). Mpox (Monkeypox). In *StatPearls*. StatPearls Publishing. <http://www.ncbi.nlm.nih.gov/books/NBK574519/>
- Nolen, L. D., Osadebe, L., Katomba, J., Likofata, J., Mukadi, D., Monroe, B., Doty, J., Kalemba, L., Malekani, J., Kabamba, J., Bomponda, P. L., Lokota, J. I., Balilo, M. P., Likafi, T., Lushima, R. S., Tamfum, J.-J. M., Okitolonda, E. W., McCollum, A. M., & Reynolds, M. G. (2015). Introduction of Monkeypox into a Community and Household: Risk Factors and Zoonotic Reservoirs in the Democratic Republic of

- the Congo. *The American Journal of Tropical Medicine and Hygiene*, 93(2), 410–415. <https://doi.org/10.4269/ajtmh.15-0168>
- Okuyay, R. A., Bayrak, E., Kaya, E., Sahin, A. R., Kocyigit, B. F., Tasdogan, A. M., Avci, A., & Sümbül, H. E. (2022). Another Epidemic in the Shadow of Covid 19 Pandemic: A Review of Monkeypox. *EURASIAN JOURNAL OF MEDICINE AND ONCOLOGY*, 6(2), 95–99.
- Peiró-Mestres, A., Fuertes, I., Camprubí-Ferrer, D., Marcos, M. Á., Vilella, A., Navarro, M., Rodriguez-Elena, L., Riera, J., Català, A., Martínez, M. J., & Blanco, J. L. (2022). Frequent detection of monkeypox virus DNA in saliva, semen, and other clinical samples from 12 patients, Barcelona, Spain, May to June 2022. *Eurosurveillance*, 27(28), 2200503. <https://doi.org/10.2807/1560-7917.ES.2022.27.28.2200503>
- Petersen, E., Kantele, A., Koopmans, M., Asogun, D., Yinka-Ogunleye, A., Ihekweazu, C., & Zumla, A. (2019). Human Monkeypox: Epidemiologic and Clinical Characteristics, Diagnosis, and Prevention. *Infectious Disease Clinics of North America*, 33(4), 1027–1043. <https://doi.org/10.1016/j.idc.2019.03.001>
- Poland, G. A., Kennedy, R. B., & Tosh, P. K. (2022). Prevention of monkeypox with vaccines: A rapid review. *The Lancet Infectious Diseases*, 22(12), e349–e358. [https://doi.org/10.1016/S1473-3099\(22\)00574-6](https://doi.org/10.1016/S1473-3099(22)00574-6)
- Quiner, C. A., Moses, C., Monroe, B. P., Nakazawa, Y., Doty, J. B., Hughes, C. M., McCollum, A. M., Ibata, S., Malekani, J., Okitolonda, E., Carroll, D. S., & Reynolds, M. G. (2017). Presumptive risk factors for monkeypox in rural communities in the Democratic Republic of the Congo. *PLOS ONE*, 12(2), e0168664. <https://doi.org/10.1371/journal.pone.0168664>

- Reynolds, M. G., Carroll, D. S., & Karem, K. L. (2012). Factors affecting the likelihood of monkeypox's emergence and spread in the post-smallpox era. *Current Opinion in Virology*, 2(3), 335–343. <https://doi.org/10.1016/j.coviro.2012.02.004>
- Riccò, M., Ferraro, P., Camisa, V., Satta, E., Zaniboni, A., Ranzieri, S., Baldassarre, A., Zaffina, S., & Marchesi, F. (2022). When a Neglected Tropical Disease Goes Global: Knowledge, Attitudes and Practices of Italian Physicians towards Monkeypox, Preliminary Results. *Tropical Medicine and Infectious Disease*, 7(7), Article 7. <https://doi.org/10.3390/tropicalmed7070135>
- Rizk, J. G., Lippi, G., Henry, B. M., Forthal, D. N., & Rizk, Y. (2022). Prevention and Treatment of Monkeypox. *Drugs*, 82(9), 957–963. <https://doi.org/10.1007/s40265-022-01742-y>
- Saied, A. A., Dhawan, M., Metwally, A. A., Fahrni, M. L., Choudhary, P., & Choudhary, O. P. (2022). Disease History, Pathogenesis, Diagnostics, and Therapeutics for Human Monkeypox Disease: A Comprehensive Review. *Vaccines*, 10(12), Article 12. <https://doi.org/10.3390/vaccines10122091>
- Sampson, M. M., Polk, C. M., Fairman, R. T., DeWitt, M. E., Leonard, M. K., Davidson, L., McCurdy, L., & Passaretti, C. L. (2022). Monkeypox testing delays: The need for drastic expansion of education and testing for monkeypox virus. *Infection Control & Hospital Epidemiology*, 1–2. <https://doi.org/10.1017/ice.2022.237>
- Sklenovská, N., & Van Ranst, M. (2018). Emergence of Monkeypox as the Most Important Orthopoxvirus Infection in Humans. *Frontiers in Public Health*, 6. <https://www.frontiersin.org/articles/10.3389/fpubh.2018.00241>

StataCorp. (2013). *Stata Statistical Software: Release 13* [Computer software]. StataCorp LP.

Tarín-Vicente, E. J., Alemany, A., Agud-Dios, M., Ubals, M., Suñer, C., Antón, A., Arando, M., Arroyo-Andrés, J., Calderón-Lozano, L., Casañ, C., Cabrera, J. M., Coll, P., Descalzo, V., Folgueira, M. D., García-Pérez, J. N., Gil-Cruz, E., González-Rodríguez, B., Gutiérrez-Collar, C., Hernández-Rodríguez, Á., ... Mitjà, O. (2022). Clinical presentation and virological assessment of confirmed human monkeypox virus cases in Spain: A prospective observational cohort study. *The Lancet*, 400(10353), 661–669. [https://doi.org/10.1016/S0140-6736\(22\)01436-2](https://doi.org/10.1016/S0140-6736(22)01436-2)

Velavan, T. P., & Meyer, C. G. (2022). Monkeypox 2022 outbreak: An update. *Tropical Medicine & International Health*, 27(7), 604–605.
<https://doi.org/10.1111/tmi.13785>

Weaver, J. R., & Isaacs, S. N. (2008). Monkeypox virus and insights into its immunomodulatory proteins. *Immunological Reviews*, 225(1), 96–113.
<https://doi.org/10.1111/j.1600-065X.2008.00691.x>

Wise, J. (2022). Monkeypox: New clinical symptoms are identified in confirmed cases. *BMJ*, 378, o1845. <https://doi.org/10.1136/bmj.o1845>

World Health Organization. (2022). *Monkeypox*. <https://www.who.int/news-room/fact-sheets/detail/monkeypox>

APPENDIX

Appendix 1. Knowledge and Attitude Questionnaire

General Instruction: The following sections includes socio-demographic, economic, and knowledge questions related to the study. Kindly choose your answer by ticking the blank boxes to complete the questionnaire.

Pangkalahatang Panuto: Ang mga sumusunod na seksyon ay kinabibilangan ng mga katanungang sosyo-demograpiko, pang-ekonomiya, at kaalaman na may kaugnayan sa pag-aaral. Mangyaring piliin ang iyong sagot sa pamamagitan ng pagmarka sa mga blangkong kahon upang makumpleto ang talatanungan.

Socio-Demographic and Economic Characteristics	
What is your age? _____	Do you have job? ☐ Yes ☐ No
Sex ☐ Male ☐ Female ☐ Other: _____	Family Monthly Income (in Philippine Peso) ☐ 0 – 25,000 ☐ 25,001 – 50,000 ☐ 50,001 – 75,000 ☐ 75,000+
Marital Status ☐ Single ☐ Engaged ☐ Married ☐ Separated ☐ Widowed ☐ Divorced	Vaccination History (You may check more than 1 statement) ☐ Complete COVID-19 vaccine shots (2 or more shots) ☐ Complete childhood vaccination
Nationality ☐ Filipino ☐ Other: _____	Mother's Highest Level of Education ☐ Highschool and below ☐ Undergraduate or bachelor's degree ☐ Graduate and Post-graduate degree
Residency ☐ Rural ☐ Urban	Father's Highest Level of Education ☐ Highschool and below ☐ Undergraduate or bachelor's degree ☐ Graduate and Post-graduate degree
High School Grade Level ☐ 7 th Grade ☐ 10 th Grade ☐ 8 th Grade ☐ 11 th Grade ☐ 9 th Grade ☐ 12 th Grade	

Knowledge about Monkeypox	
Statements (Mga Pahayag)	
Monkeypox is spread by droplets (coughing and sneezing). <i>(Ang monkeypox ay kumakalat sa pamamagitan ng droplets (pag-ubo at pagbahing).)</i>	☐ Yes (Oo)* ☐ No (Hindi) ☐ I do not know (Hindi ko alam)
The first symptoms of monkeypox are similar to the flu. <i>(Ang mga unang sintomas ng monkeypox ay katulad ng trangkaso.)</i>	☐ Yes (Oo)* ☐ No (Hindi) ☐ I do not know (Hindi ko alam)
Skin rash is a symptom of monkeypox. <i>(Ang pantal sa balat ay sintomas ng monkeypox.)</i>	☐ Yes (Oo)* ☐ No (Hindi) ☐ I do not know (Hindi ko alam)

Monkeypox only affects males. <i>(Ang monkeypox ay nakakaapekto lamang sa mga lalaki.)</i>	☐ Yes (Oo) ☐ No (Hindi)* ☐ I do not know (Hindi ko alam)
Hand sanitizers and face masks are important in preventing monkeypox. <i>(Ang mga hand sanitizer at face mask ay mahalaga sa pag-iwas sa monkeypox.)</i>	☐ Yes (Oo)* ☐ No (Hindi) ☐ I do not know (Hindi ko alam)
There is a special treatment for monkeypox. <i>(Mayroong espesyal na paggamot para sa monkeypox.)</i>	☐ Yes (Oo) ☐ No (Hindi)* ☐ I do not know (Hindi ko alam)
Monkeypox is spread through bodily fluids. <i>(Ang monkeypox ay kumakalat sa pamamagitan ng mga likido sa katawan.)</i>	☐ Yes (Oo)* ☐ No (Hindi) ☐ I do not know (Hindi ko alam)
There is a monkeypox vaccine available in the Philippines. <i>(Mayroong bakunang monkeypox na makukuha sa Pilipinas.)</i>	☐ Yes (Oo)* ☐ No (Hindi) ☐ I do not know (Hindi ko alam)
The chickenpox vaccine I got in childhood protects me from monkeypox. <i>(Pinoprotektahan ako ng bakunang bulutong-tubig noong bata pa ako mula sa monkeypox.)</i>	☐ Yes (Oo) ☐ No (Hindi)* ☐ I do not know (Hindi ko alam)
There is a smallpox vaccine that can be used for monkeypox. <i>(May bakuna sa bulutong na maaaring gamitin para sa monkeypox.)</i>	☐ Yes (Oo)* ☐ No (Hindi) ☐ I do not know (Hindi ko alam)

*Correct answer

General Instruction: The next section of the questionnaire is comprised of statements that will measure the attitude of the participant through Likert Scale. For each statement, encircle the response that best characterizes how you feel about the corresponding statements.

Pangkalahatang Panuto: Ang susunod na seksyon ng talatanungan ay binubuo ng mga pahayag na susukat sa saloobin ng kalahok sa pamamagitan ng Likert Scale. Para sa bawat pahayag, bilugan ang tugon na pinakamahusay na nagpapakilala sa nararamdaman mo tungkol sa mga kaukulang pahayag.

1= Strongly Disagree

3=Neutral

5= Strongly Agree

2=Disagree

4= Agree

Attitude towards Monkeypox					
Statements (Mga Pahayag)	Strongly Disagree (Lubos na Hindi Sumasang-ayon)	Disagree (Hindi sumasang-ayon)	Neutral	Agree (Sumasang-ayon)	Strongly Agree (Lubos na Sumasang-ayon)
I am sure that the global population will be able to control					

the monkeypox virus epidemic. (Sigurado ako na makokontrol ng pandaigdigang populasyon ang epidemya ng monkeypox virus.)	1	2	3	4	5
I believe that monkeypox virus prevention and control measures are adequately available. (Naniniwala ako na ang mga hakbang sa pag-iwas at pagkontrol ng monkeypox virus ay sapat na magagamit.)	1	2	3	4	5
I have negative feelings about the monkeypox virus. (Mayroon akong negatibong damdamin tungkol sa monkeypox virus.)	1	2	3	4	5
I believe that monkeypox virus adds additional strain on the healthcare systems of the affected countries. (Naniniwala ako na ang monkeypox virus ay nagdaragdag ng karagdagang strain sa mga sistema ng pangangalagang pangkalusugan ng mga apektadong bansa.)	1	2	3	4	5
I think that monkeypox virus can be transmitted to the Philippines. (Sa tingin ko, ang monkeypox virus ay maaaring maipasa sa Pilipinas.)	1	2	3	4	5
I believe that media coverage of monkeypox virus may have an impact on its global prevention. (Naniniwala ako na ang media coverage ng monkeypox virus ay maaaring magkaroon ng epekto sa pandaigdigang pag-iwas nito.)	1	2	3	4	5
I think monkeypox virus will become a new pandemic, and its impact will be like COVID-19. (Sa tingin ko ang monkeypox virus ay magiging isang bagong pandemya, at ang epekto nito ay magiging tulad ng COVID-19.)	1	2	3	4	5
I would like to learn more about the epidemiology of new emerging diseases. (Gusto kong matuto nang higit pa tungkol sa epidemiology ng mga bagong umuusbong na sakit.)	1	2	3	4	5
I believe that traveling to monkeypox virus infected countries is risky. (Naniniwala ako na ang paglalakbay sa mga bansang nahawaan ng monkeypox virus ay delikado.)	1	2	3	4	5

Appendix 2. Personal Contribution

Rainer Pier Paolo M. Ambrocio carried out the conceptualization and designing of the study, process the documents for data collection in Santo Rosario National High School, Santo Domingo, Nueva Ecija, Philippines, participated in analyzation and interpretation of data, and drafted the manuscript.