Project on

Literature review on recent outbreak of monkey pox

[In the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy]

Submitted To

The Department of Pharmacy,

Faculty of Allied Health Sciences,

Daffodil International University

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Approval

This project paper, **"Literature review on recent outbreak of monkey pox"**, submitted to the Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy and approved as to its style and contents.

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Declaration

I hereby declare that this project report, **"Literature review on recent outbreak of monkey pox",** is done by me under the supervision of Mr. Pollob Ahmed Shuvo Lecturer, Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University. I am declaring that this Project is my original work. I also declare that neither this project nor any part thereof has been submitted elsewhere for the award of Bachelor or any degree.

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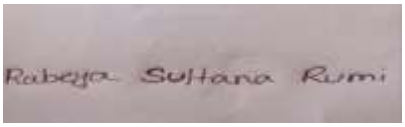

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Acknowledgement

I might want to communicate my profound applause to the All-powerful Allah who has given me the capacity to finish my undertaking work and the chance to concentrate in this subject.

I'm a lot of thankful to my honorable project supervisor of Mr. Pollob Ahmed Shuvo Lecturer, Department of Pharmacy, Daffodil International University for her brilliant direction and steady oversight just as for giving essential data in regards to the task and furthermore for her help in finishing the project.

I would like to express my humble regards to Dr. Muniruddin Ahmed, Professor and Head, Department of Pharmacy, Daffodil International University.

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Finally, I would like to express my gratitude towards my parents and other family members for their kind cooperation and encouragement which helped me in completion of this project.

Dedication……

My Parents

The persons who always encourage me in every sphere of my life.

Abstract

Background: An ongoing outbreak of monkey pox, a viral disease then commonly known as “monkey pox”, was confirmed in May 2022. Some of the symptoms include a high temperature, enlarged lymph nodes, and a rash that starts out as blisters before becoming crusty. A more recent vaccine for smallpox and monkey pox that is based on modified vaccinia Ankara has been given the green light for use, but there is only a limited supply of it.

Objectives: The present article focuses on the death caused by monkey pox globally, clinical characteristics of monkey pox, therapies for the management of monkey pox.

Method: A framework of research methodologies, as well as methods for gathering and analyzing data, is provided by a methodological review. A search was done using keywords such "Monkey pox and Smallpox," "therapies of monkey pox,” in online search engines, academic bibliographic databases, PubMed, and Medline.

Results: In 2022, monkey pox spread widely, with most victims residing in Africa. The incubation times for smallpox, monkey pox, and varicella are 7–17 days, 10–21 days, and 10–21 days, respectively. Smallpox, monkey pox, and varicella all cause rashes that last 14–28 days, 10–21 days, and 10–21 days, respectively. Smallpox and monkey pox prodromal fevers reach fever levels of over 40°C, whereas varicella prodromal fever is mild. Moreover, the varicella virus increases body temperatures to a maximum of 38.8°C, which are often between 38.5°C and 40.5°C. According to a review study, the first antiviral authorized for the treatment of smallpox in adults and pediatric patients weighing at least 3 kg is Tecovirimat (also known as TPOXX or ST-246), which is regarded as the preferred treatment.

Conclusion: Monkey pox is a rare viral disease that mostly affects remote areas of Central and West Africa. One technique of protection is avoiding contact with animals that might be infected with the virus. There is a monkey pox vaccine, however it is mostly used in clinical and laboratory settings and is not often available to the general public.

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Introduction

1.1 Virus

Viruses are very small infectious organisms that can only multiply inside the cells of a living host. Viruses can only infect living cells. [1] Viruses are a danger to every living creature on Earth, from macroorganisms like animals and plants to microorganisms like bacteria and archaea. They may cause disease in all of these different types of organisms.[2] Since Dmitri Ivanovsky's 1892 article describing a non-bacterial pathogen infecting tobacco plants and Martinus Beijerinck's 1898 discovery of the tobacco mosaic virus,[3] more than 9,000 virus species have been described in detail,[4] with the Zika virus being the most recent to be described in 2006.There are millions of different types of viruses in the environment, but since Martinus Beijerinck's 1898 discovery of the tobacco mosaic virus and D [5-6] Viruses are the most common kind of living entity and may be discovered in practically every setting on Earth. They are responsible for almost all disease. [7] [8] The study of viruses is the primary focus of the sub discipline of microbiology known as virology. When a cell gets infected with a virus, it is sometimes required to produce thousands of copies of the original virus in an extremely short amount of time. Independent particles, also known as visions, may be seen most of the time when a virus is not present inside an infected cell or when it is not in the process of infecting a cell. I the genetic material, which is made up of long molecules of DNA or RNA that encode the structure of the proteins by which the virus acts; ii the capsid, which is a protein coat that surrounds and protects the genetic material; and iii, in some cases, an outer envelope made of lipids. These particles make up the virus. I the genetic material, which is made up of long molecules of DNA or RNA that encode the structure of the proteins by which the virus acts. These viral particles have the potential to assume a broad variety of forms, ranging from the simplest helical and icosahedral structures to more sophisticated geometrical arrangements. It is not feasible to view the virions of most virus species with an optical microscope since the virions of most virus species are one tenth the size of most bacteria.Plasmids are mobile fragments of DNA, and it's possible that certain viruses arose from them. Other viruses, on the other hand, could have come from bacteria. In the same way that the horizontal transmission of genes by viruses is essential to the evolutionary processes that take place, genetic diversity may be increased via sexual reproduction. [9-10] Some scientists believe that viruses are living forms

despite the fact that they lack fundamental characteristics, such as cell structure, that are generally considered to be crucial requirements for defining life. These characteristics include the ability to reproduce, pass on genetic information to offspring, and evolve as a result of natural selection.

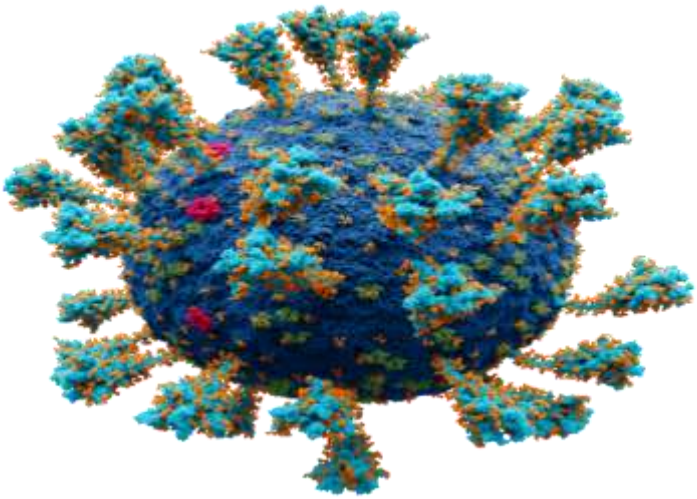

Figure 1: Viruses

Replicators and "organisms on the edge of life" are two names that have been given to viruses due to the fact that they share some of these features but not others. [11] There are many different kinds of carriers that viruses may employ to spread. Vectors are organisms that carry diseases and have the potential to transmit them to other hosts. For instance, aphids and other insects that feed on plant sap have the potential to transmit viruses from one plant to another, and blood-sucking insects have the potential to transmit viruses from one mammal to another. The common cold, SARS-CoV-2, chickenpox, smallpox, and measles are only few of the viruses that may be spread via the air by coughing and sneezing. Other viruses that can be spread include the common cold and smallpox. Noroviruses and rotaviruses are the two viruses that are responsible for the vast majority of cases of viral gastroenteritis. Viral gastroenteritis may be caused by a variety of other viruses. It takes far less than one hundred norovirus particles to get a person sick with the sickness. [12] HIV is only one of several viruses that may be spread via sexual contact or blood contact. The "host range" of a virus refers to the many kinds of cells that it is capable of infecting. If a virus can only infect a limited number of species, then its host range is considered to be confined. On the other hand, if it can infect a vast variety of organisms, then its host range is considered to be broad. When a virus infects an animal, the body generates an immune response in an effort to clear itself of the foreign invader and prevent further infection. Vaccines, which offer an immunity against a particular viral infection that is intentionally acquired, may also be used to induce immune responses in the

recipient. Viruses such as HIV/AIDS, human papillomavirus (HPV), and hepatitis viruses, on the other hand, are able to circumvent these defenses and live within the body for lengthy periods of time. In order to battle viruses, researchers have developed a variety of distinct classes of antiviral medications. [13]

1.2 Origins

Viruses are ubiquitous in the biosphere and have likely been there from the earliest days of cellular existence. [14] Since viruses cannot leave fossils, scientists have to resort to molecular methods to learn about their early history. [15] Furthermore, viruses are often able to integrate their genetic material into the germline of their host species, allowing them to be passed on to subsequent generations of the host's progeny. This offers paleo virologists with a goldmine of data for reconstructing the history of viruses that have been around for millions of years. There are three primary theories that attempt to clarify where viruses came from: [16-17]

A. Regressive hypothesis -Perhaps viruses evolved from smaller cells that parasitized bigger ones. As time went on, parasitism-unrelated genes were eliminated. Both rickettsia and chlamydia are examples of bacteria, and like viruses, they can only multiply while within a host cell. They provide credence to the theory, since they presumably lost genes that allowed them to thrive outside of a cell due to their need on parasitism. Sometimes referred to as the "degeneracy hypothesis"[18-19] or the "reduction hypothesis," this idea goes by a few different names. [20]

B. Cellular origin hypothesis

The genetic material of one creature may have "escaped" and given rise to the genes of a virus. Potential sources of the escaping DNA include plasmids and transposons. Plasmids are mobile bits of bare DNA that may jump from cell to cell (molecules of DNA that replicate and move around to different positions within the genes of the cell). [21] Transposons, which were once referred to as "jumping genes," are an example of mobile genetic components and may represent the virus's original source. Barbara McClintock first noticed them in maize in the year 1950.The term "vagrancy hypothesis" has been used to describe this phenomenon [22]. This is known as "escape hypothesis" for short. [23]

Co-evolution hypothesis - One alternative name for this idea is the "virus-first hypothesis."suggests that viruses depended on cellular life for billions of years since they emerged from complex molecules of protein and nucleic acid at the same time cells first arose on Earth. Viroids are non-viral RNA molecules. This is because they do not have a protein coat, which is a characteristic

shared by viruses. They are sometimes referred to as subviral agents since they share properties with many viruses. Plants are susceptible to a wide variety of viral diseases. [24] They connect with the host cell and replicate with the help of the host cell's machinery but lack their own coding for proteins. [25] The human hepatitis delta virus shares an RNA genome with viroids but uses a protein coat borrowed from the hepatitis B virus rather than producing its own. A flawed virus is what this is. Even though the hepatitis delta virus DNA may reproduce on its own once within a host cell, the virus cannot infect new cells without the protein coat provided by the hepatitis B virus. [26] Mimivirus, which infects the protozoan Acanthamoeba castellanii, is also required for the survival of the sputnik virophage. [27] These viruses, known as "satellites," are reliant on the existence of other viral species in the host cell and may represent evolutionary intermediates between viroids and viruses. [28-29] All of these theories had issues in the past, for example, the regressive theory failed to explain why even the tiniest cellular parasites are not similar to viruses. The intricate capsids and other viral particle structures could not be explained by the escape concept. By definition, viruses can only replicate inside of living host cells, hence the virus-first idea ran counter to this fact.It is now understood that viruses predate the separation of life into the three domains and have existed for a very long time.This new information has caused virologists to reevaluate and rethink three long-held theories. Such studies have not settled the debate over which of these theories is more accurate. [31] It's very improbable that all known viruses descended from a single source, and it's possible that viruses have repeatedly emerged in the past via several ways. [32]

1.3 Classifications of viruses

a) Class I: Double stranded DNA (dsDNA) viruses.
b) Class II: Single stranded DNA (ssDNA) viruses.
c) Class III: Double stranded RNA (dsRNA) viruses.
d) Class IV: Single stranded RNA (ssRNA) viruses.
e) Class V: Single stranded RNA (ssRNA) viruses.

Chapter Two
Literature Review

2.1 Monkeypox

The illness known as monkeypox is caused by a virus that is contagious and may affect both people and other animals. Some of the symptoms include a high temperature, enlarged lymph nodes, and a rash that starts out as blisters before becoming crusty. The time it takes for symptoms to appear after exposure might vary anywhere from five to twenty-one days. [33] The average length of time that symptoms last is between two and four weeks. There may be just a few, moderate signs, or it may take place with no symptoms at all being recognized. [34] It has been discovered that the characteristic presentation of shingles, which consists of fever and muscular aches, followed by swollen glands, and lesions all occurring at the same stage, is not present in every outbreak. Some cases, particularly those affecting youngsters, pregnant women, or those with compromised immune systems, may be quite serious. This illness is brought on by the monkeypox virus, which belongs to the genus Orthopoxvirus and is a zoonotic virus. [35] This genus also contains the variola virus, which is responsible for causing the disease known as smallpox. Of the two forms that may affect humans, clade II (previously known as the West African clade) is associated with an illness that is less severe than the one that originates in Central Africa (the Congo basin). Transmission from infected animals may occur via the handling of contaminated meat, as well as through bites and scratches. Transmission from one individual to another may take place when a person is exposed to infected bodily fluids or contaminated items, when there is a little droplet-to-droplet contact, or even by the airborne route. The virus may be passed from person to person from the time symptoms first appear until all of the lesions have crusted over and fallen off; however, there is evidence of dissemination for more than a week after lesions have crusted over. The diagnosis may be verified by doing a DNA test on a lesion to look for the virus. Nobody has found a treatment that works. A research that was conducted in 1988 indicated that the smallpox vaccination had a protective efficacy of around 85% when it came to avoiding infection in people who were in close contact with one another and reducing the severity of the illness. [36] A more recent vaccine for smallpox and monkeypox that is based on modified vaccinia Ankara has been given the green light for use, but there is only a limited supply of it.In addition, it is important to wash your hands often and stay away from ill people and animals.During an epidemic, antiviral medications like as cidofovir and tecovirimat, as well as vaccinia immune globulin and the smallpox vaccination, may be administered.

Figure 2: Monkeypox

The majority of people who are infected will recover within a few weeks even if they don't get treatment since the sickness is often minor. Estimates of the risk of mortality range from 1% to 10%, however very few fatalities have been documented as a result of monkeypox since 2017.It is hypothesized that a number of different mammalian species serve as natural reservoirs for the virus.[37-39] Although it was originally considered to be rare in humans, the number of outbreaks as well as their intensity has considerably risen since the 1980s. [40] It is possible that this is due to diminishing immunity as a consequence of the cessation of regular smallpox immunization. In 1970, the Democratic Republic of the Congo was the location where researchers discovered the first instances of the disease in people (DRC). There have been isolated incidents of this disease throughout Central and West Africa, but it is prevalent in the Democratic Republic of the Congo. [41] The outbreak of monkeypox in 2022 is the first time that widespread community transmission has occurred outside of Africa. It was first discovered in the United Kingdom in May of that year, and subsequent cases have been confirmed in at least 74 countries across all continents with the exception of Antarctica.The World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern (PHEIC) on July 23, 2022. At the time of the declaration, more than 53,000 cases had been reported in 75 countries and territories. [42]

2.2 Signs and symptoms

Despite its terrible potential, monkeypox is often a brief, self-limiting viral illness that causes a rash. Most patients get well within a couple of weeks without medical help. It is possible for individuals to get critically ill and even die under certain situations. Symptoms of monkeypox often appear between 5 and 21 days after infection. There may be a progression of symptoms over the course of 2 weeks to 4 weeks. Painful rashes may appear anywhere on the body, including:

- mouth

- genitals
- perianal
- face
- the body's limbs, feet

The rash goes through many phases during the course of its typical 14–28-day duration. At last, scabs develop and eventually fall off. Accompanying the rash may be universal signs such as:

- fever
- chills
- enlarged lymph glands
- headache
- Tense muscles
- aching joints
- hurting back
- exhaustion

From the time the initial symptoms appear until the scabs come off on their own and the skin heals, you will be infectious. [43-44]

2.3 Causes

The monkeypox virus is a member of the Poxviridae family and the genus Orthopoxvirus. It has two strands of DNA and is a double-stranded virus. It has the potential to infect both humans and animals. This virus, which was detected for the first time in monkeys that were held in zoos, is most often found in the tropical rainforests of Central and West Africa. There are two different viral subtypes, and they are clade I and clade II (formerly Congo Basin and West African clades, matching the geographical areas). Dormice (Graphiurus spa), African squirrels, and Gambian pouched rats (Cricetomysgambianus) have all tested positive for the virus thus far in addition to monkeys (Heliosciurus, and Funisciurus). Consumption of diseased animals raises significant worries about the possibility of infection in humans. [45]

2.4 Diagnosis

- It is important to rule out other rash-causing diseases when making a clinical diagnosis, such as chickenpox, measles, bacterial skin infections, scabies, syphilis, and medication-related allergies. Monkeypox may be distinguished from chickenpox and smallpox by the presence of lymphadenopathy during the prodromal stage of disease. It is possible to confirm a diagnosis by doing a test for the virus.
- It is recommended that samples taken from skin lesions be analyzed by polymerase chain reaction (PCR) testing in the lab. Due to the little period the virus spends in the blood, PCR blood tests are sometimes inconclusive. Date of fever beginning, date of rash commencement, date of specimen collection, stage of rash at time of collection, and patient age are all necessary for interpreting test findings. [46]

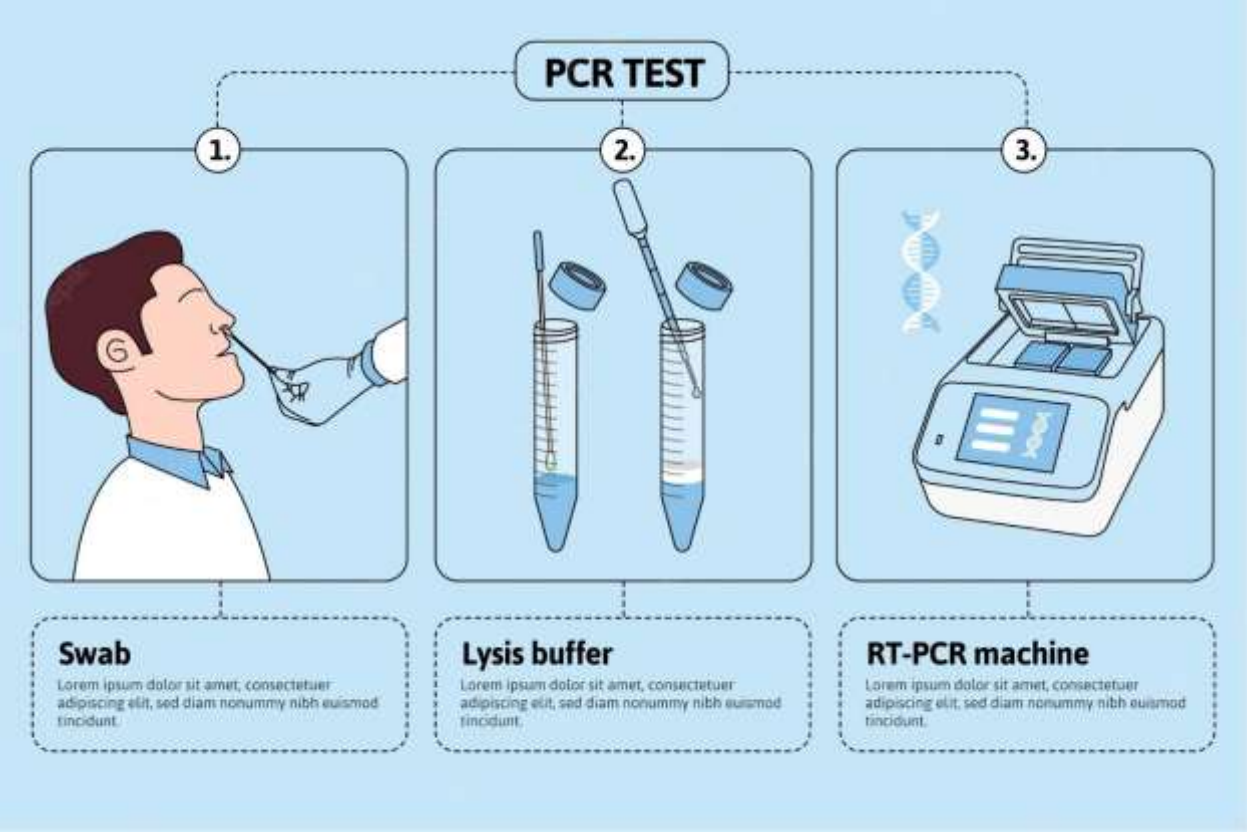

Figure 3: PCR Test

2.5 Risk Factors

It's possible that some groups of individuals have a higher chance of getting monkeypox than others. Those who are more likely to develop a severe case of monkeypox include:

International travelers: Anyone who goes to an endemic country (areas where the virus has continued circulation) or places with outbreaks is at a higher risk for monkeypox. This includes both domestic and international travelers. [47] If you engage in activities that put you in touch with infected people or animals, the likelihood of contracting the disease increases significantly.

People who participate in anonymous sexual activity: Although monkeypox is not considered a sexually transmitted infection (STI) since it may be spread in other ways, it is nevertheless contagious and can be passed on by bodily fluids, close touch, and skin-to-skin contact. The worldwide epidemic that occurred in 2022 was mostly transmitted from person to person via sexual contact.

People who have contact with animals with the virus: When a person comes into touch with an infected animal (such as a monkey, rat, or squirrel), there is a risk that they may get monkeypox from that animal and pass it on to themselves. This may happen if you are bitten or scratched by an animal infected with monkeypox. It is also possible to get monkeypox from coming into contact with the lesions or saliva of an infected animal. [48]

Healthcare workers: After providing medical attention to a patient who is afflicted with monkeypox, you run the risk of catching the illness yourself. In a medical facility, the virus may be spread by direct contact with a patient's body fluids, lesions, or respiratory droplets. Another mode of transmission is through the spread of respiratory droplets. It is also possible to get it by coming into touch with the clothes or bedding that a person infected with the virus wore. [49]

2.6 Prevention

Because smallpox and monkeypox are closely related viruses, and the vaccine protects animals against experimental deadly monkeypox challenges, it is a commonly held belief that vaccination against smallpox also protects against infection with monkeypox in humans. This is due to the fact that the vaccine protects animals against experimental deadly monkeypox challenges. [50] This has not been demonstrated to be the case in humans since extensive vaccination against smallpox was discontinued when it was reported that the illness had been eliminated. People in Africa who have had the smallpox immunization may have a lower risk of contracting monkeypox compared to those who have not received the vaccination. One explanation for the widespread occurrence of monkeypox is that populations are gradually losing their resistance to poxviruses as a result of

recurrent exposure to these viruses. Cross-protective immunity among people who were inoculated before to 1980. persons is being blamed for this. The Centers for Disease Control and Prevention (CDC) strongly recommends that anybody who will be doing research on monkeypox outbreaks or giving medical treatment to humans or animals who have been infected with monkeypox be vaccinated against smallpox. Anyone who has had direct or intimate contact with a monkeypox carrier, whether the carrier is a human or an animal, should be vaccinated against the disease. Unless they are going to be doing field investigations, the Centers for Disease Control and Prevention (CDC) does not recommend vaccination before to exposure for unknown veterinarians, veterinary personnel, or animal control authorities who may come into contact with the disease. As of the time this article was written, neither the immunization for smallpox nor the vaccination for monkeypox is considered to be safe for use during pregnancy. [51] Before treating an infected patient, medical personnel should dress in full personal protective equipment (PPE), as directed by the Centers for Disease Control and Prevention (CDC). It includes a gown, a mask, goggles, and a respirator that has a filter that can be thrown away after each use (such as an N95).

Figure 4: Respirator

In a perfect world, a person who is infected would be isolated in a chamber with negative air pressure; nevertheless, a private examination room might do in a pinch. [52] Vaccination alone is not sufficient to prevent monkeypox; other measures are necessary. The availability of treatment, the dependability of information, and the quality of health care are all becoming more pressing concerns. Effective communication is perhaps the aspect of public health that presents the biggest challenge. Due to the inherent complex interconnection of the illness as well as the negotiated social meanings, accurate

communication about public health has to be a collaborative effort between medical professionals and people. This is the reason why, as Salving argues in the BMJ, we need a "new ethic of shared responsibility" to warn the public of possible hazards and equip disadvantaged populations with the tools they lack to make informed choices. [53]

2.7 Treatment

In both the European Union and the United States, studies have demonstrated that the antiviral medication tecovirimat is effective against a variety of poxviruses, including monkeypox. [54] In addition to supportive care, the antiviral medicine tecovirimat or brincidofovir, which is used to treat smallpox, is recommended as a first-line alternative by BMJ Best Practice in the event that antiviral therapy is required (including antipyretic, fluid balance and oxygenation). An empirical therapy with antibiotics or acyclovir may be offered if it is thought that the patient may develop a future infection with bacteria or varicella zoster. [55]

Figure 5: Tecovirimat

2.8 Monkeypox virus

The monkeypox virus is a DNA virus that has the potential to infect people as well as other animals. It is also known as the monkeypox X virus and the human monkeypox X virus. Approximately 190 kilobytes make up the whole of the genome. [56] The monkeypox virus is a member of the family

Orthopoxviridae, which also contains the variola (VARV), cowpox (CPX), and vaccinia (VACV) viruses. These are all viruses that are only remotely related to the monkeypox virus. This virus does not derive directly from the variola virus that causes smallpox, nor does it have a common ancestor with the virus that causes smallpox (variola virus). Although clinically similar to smallpox, monkeypox is characterized by a milder form of the disease's hallmark rash and has a reduced risk of death. [57-59] It is not necessary for an animal and a person to come into touch with one another for the virus to be transmitted from animal to human. [60] Even though monkeys were the first animals to be infected with the virus that would later be recognized as monkeypox, rodents are currently considered to be the most frequent reservoir hosts. It has been shown that the virus exhibits some degree of virulence variation, as it has been found that isolates from Central Africa have a greater virulence than isolates from Western Africa. The virus has now divided into two clades, one of which is unique to each location. These clades were once known as the clade that originated in the Congo Basin (Central Africa) and the clade that originated in West Africa, respectively. [61]

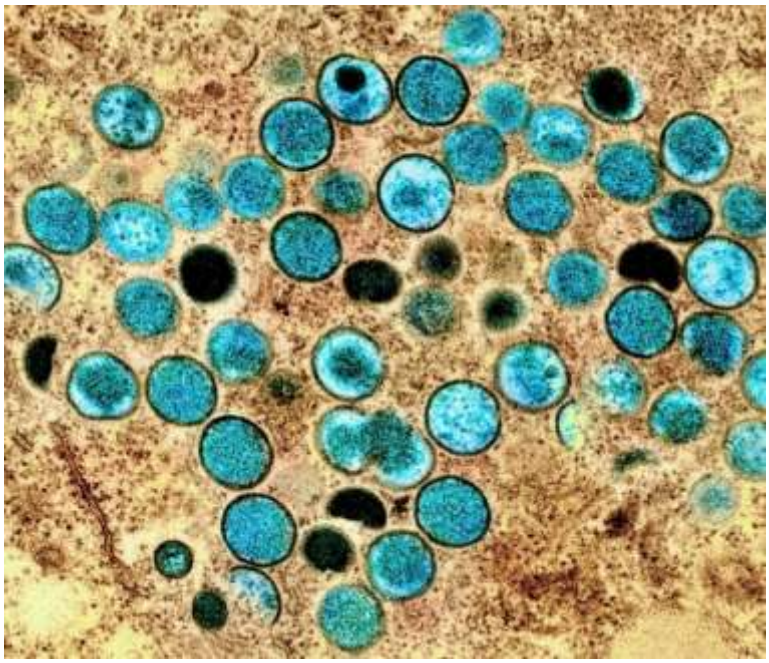

Figure 6: Monkeypox virus

2.9 Virology

Classification

The World Health Organization (WHO) has placed MPV on its list of illnesses that have the potential to become epidemic or pandemic. MPV is classified as a member of the genus Orthopoxvirus, which is part of the Poxviridae family. [62]

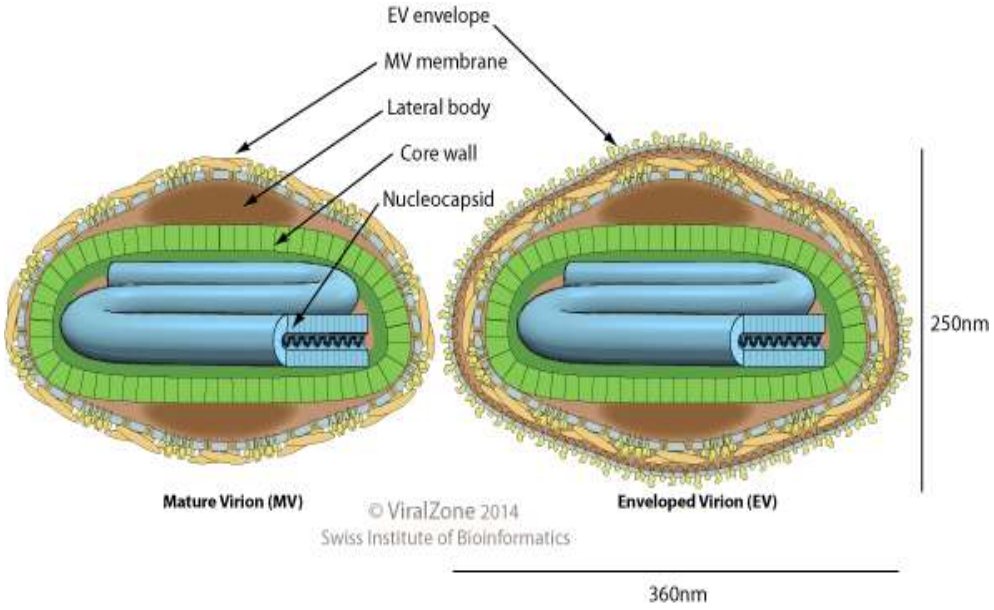

Figure 7: Orthopoxvirus

The monkeypox virus, like other poxviruses, has an oval shape and an exterior membrane that is composed of a lipoprotein. Enzymes, DNA, and transcription factors of the virus are shielded from the outside environment by the virus's outer membrane. [63] The genome of the monkeypox virus is around 200 kilobytes in size and encodes for about 200 different proteins. It possesses double-stranded DNA that is presented in the form of a linear structure with covalently closed hairpin ends; the 3' and 5' ends are not free. [64] The irons of monkey pox have huge oval-shaped envelopes, much like the irons of other poxviruses. The 3' and 5' ends are not free. A core can be found inside of every virion, and this core contains the genome in addition to the enzymes that aid in the process of replicating and removing the protein coat. [65]

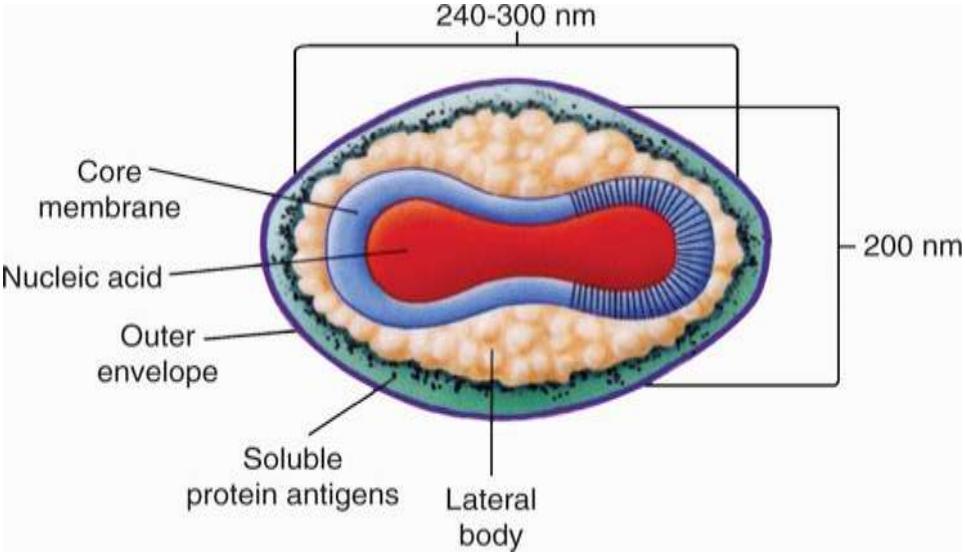

Figure 8: Poxviruses

Replication and life cycle

Gene expression begins when MPV releases viral proteins and enzymatic factors that disable the cell.Protein synthesis allows for the ER membrane of the factory to disassemble. As an orthopoxvirus, MPV replication takes place entirely in the cell cytoplasm within 'factories' created from the host rough endoplasmic reticulum (ER), where viral mRNA transcription and translation also take place. [66]

Chapter Three

Purpose of the study

3.1 Purpose of the study

Purpose of the study is,

1. to view the percentage of deaths from monkey pox worldwide.

2. to calculate the prevalence of monkeypox.

3. to overview about managing and treating monkeypox.

4. to open a new aria of higher studies

5. to gain a thorough understanding of the disease, including its cause, signs and symptoms, consequences and medical and treatment choices.

6. the purpose of this research was to understand more about monkeypox.

Chapter Four
Methodology

4.1 Introduction:

A literature review leads the examination. Around 105 papers are reviewed for this study.

4.2 Research Design:

This exploration was planned through google scholar and many other websites to find literature.

4.3 Method of Data Analysis:

After compiling a large amount of information, it was examined for accuracy and coherence within itself to rule out the possibility of missing or conflicting data, both of which were afterward thrown out. The Microsoft Dominant Refreshed Version was used in the information inquiry that was carried out. All of the information gathered is from 1990 all the way until 2022.

4.4 Ethical Considerations:

Before beginning the process of information collection, informed verbal consent was obtained from those participating in the inquiry. A veil of secrecy was maintained over the identities of those who participated in the research, and participants in the studies were informed that they were free to withdraw from the program at any point throughout the process of data collection. The inquiry garnered the backing of the Department of Pharmacy.

Chapter Five

Result and Discussion

5.1 Deaths caused by monkey pox globally

Country Name	Number of Cases	Number of deaths
Argentina	1112	2
Belgium	793	2
Bolivia	265	2
Brazil	10878	15

Table 1: Deaths caused by monkey pox globally

In 2022, monkey pox spread widely, with most victims residing in Africa, claims a review article. Bolivia has 265 cases and two fatalities confirmed, Argentina has 1112 cases and two fatalities confirmed, Belgium has 793 cases and two fatalities confirmed, and Brazil has 10878 cases and fifteen fatalities confirmed. [82].

5.2. Clinical Characteristics of Smallpox, Monkeypox, and Varicella

Characteristic	Smallpox	Monkeypox	Varicella
Incubation period	7–17 d	7–17 d	10–21 d
Rash period (from the appearance of lesions to desquamation)	14–28 d	14–28 d	10–21 d
Prodromal fever	Yes	Yes	Uncommon, mild fever if present
Fever	Yes, often >40°C	Yes, often between 38.5°C and 40.5°C	Yes, up to 38.8°C

Table 2: Clinical Characteristics of Smallpox, Monkeypox, and Varicella

The incubation times for smallpox, monkeypox, and varicella are 7–17 days, 10–21 days, and 10–21 days, respectively. Smallpox, monkeypox, and varicella all cause rashes that last 14–28 days, 10–21 days, and 10–21 days, respectively. Smallpox and monkeypox prodromal fevers reach fever levels of over 40°C, whereas varicella prodromal fever is mild. Moreover, the varicella virus increases body temperatures to a maximum of 38.8°C, which are often between 38.5°C and 40.5°C. [83]

5.3 Summary of therapies for the management of monkeypox

Treatments	Route	Dosing
Tecovirimat	PO, IV (approved in May 2022)	Adults: 600 mg twice daily for 14 days; pediatrics (13 kg or more), if 13 kg to less than 25 kg: 200 mg BID for 14 days, if 25 kg to less than 40 kg: 400 mg twice daily for 14 days, if 40 kg or more: 600 mg twice daily for 14 days
Brincidofovir	PO (tablets, oral suspension)	Adults weighing ≥ 48 kg: 200 mg once weekly for two doses; adults and pediatric patients weighing ≥10 kg to less than 48 kg: 4 mg/kg of the oral suspension once weekly for two doses; pediatrics weighing less than 10 kg, the dose is 6 mg/kg of the oral suspension once weekly for 2 doses
Cidofovir	IV	5 mg/kg once weekly for 2 weeks, followed by 5 mg/kg IV once every other week
Vaccinia immune globulin	IV	6000 U/kg as soon as symptoms appears; may repeated based on severity of symptoms and response to treatment; 9000 U/kg may be considered if patient does not respond to initial dose

Table 3: Summary of therapies for the management of monkeypox

According to a review study, the first antiviral authorized for the treatment of smallpox in adults and pediatric patients weighing at least 3 kg is Tecovirimat (also known as TPOXX or ST-246),

which is regarded as the preferred treatment. The oral equivalent of the intravenous medicine cidofovir, brincidofovir, has been approved for the treatment of smallpox in the US. Brincidofovir may have a better safety profile than cidofovir, including less kidney damage [85].

5.4 Monkeypox Patients with Seminal Fluid Viral DNA

Sexual Orientation	Concomitant STI (Site)	HIV Status
Homosexual	None	Positive
Bisexual	None	Negative
Homosexual	None	Positive
Homosexual	Gonorrhea (penis)	Negative

Table 4: Monkeypox Patients with Seminal Fluid Viral DNA

According to review an article, Monkeypox Patients with Seminal Fluid Viral DNA had HIV positive or other sexual transmission infection (STI), The all most all patients are homosexual or bisexual [86].

Chapter 6
Conclusion

6.1 Conclusion

Monkeypox is a rare viral disease that mostly affects remote areas of Central and West Africa. The smallpox-related monkeypox virus, which causes it, is the cause. The condition, which causes a rash, fever, headache, and muscular pains, has no recognized cure. One technique of protection is avoiding contact with animals that might be infected with the virus. Another is exercising additional caution when handling animals or animal products by using gloves and safety equipment. There is a monkeypox vaccine, however it is mostly used in clinical and laboratory settings and is not often available to the general public.

Chapter seven

Reference

7.1 Reference

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