GENERAL HISTORY OF EBOLA

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ABSTRACT:-

The Ebola virus is a deadly virus that is spread through contact with the bodily fluids of an infected person. It is one of the most virulent infectious diseases in humans, with mortality rates ranging from 50-90%. Ebola was first identified in 1976 in the Democratic Republic of Congo, near the Ebola River, from which it takes its name. Since then, there have been several outbreaks of the virus in Africa, with the most recent one occurring in 2014-2016 in West Africa. In the 2014-2016 outbreak, more than 28,000 people were infected and more than 11,000 people died. The World Health Organization declared the outbreak a Public Health Emergency of International Concern in August 2014. Ebola is a virus that belongs to the family of Filoviridae and is one of the most dangerous and deadly diseases known to mankind. It was first identified in 1976 in what is now the Democratic Republic of Congo. Since then, it has been responsible for numerous outbreaks in Africa and other parts of the world. The virus is believed to be spread through contact with the bodily fluids of an infected person, but can also be spread through contact with objects like bedding or clothing that has been contaminated with the virus. In some cases, the virus can also be spread through contact with infected animals, such as bats, monkeys, and fruit bats. There is no known cure for Ebola, and the mortality rate is high. However, there are treatments available to help manage the symptoms and prevent the spread of the virus. In recent years, the outbreak of Ebola in West Africa in 2014-2016 became the most widespread in history, with more than 28,000 confirmed cases and more than 11,000 deaths reported. The outbreak sparked international efforts to contain the disease, including the deployment of international medical teams, the establishment of medical centers, and the development of vaccines. In the wake of the outbreak, the World Health Organization Ebola is caused by one of five species of the

Ebolavirus genus, including the Zaire ebolavirus, the Sudan ebolavirus, the Taï Forest ebolavirus (formerly known as Côte d'Ivoire ebolavirus), the Bundibugyo ebolavirus, and the Reston ebolavirus. The Zaire ebolavirus is the most deadly and is the strain responsible for the 2014-2016 outbreak. The virus is transmitted through contact with the bodily fluids of an infected person, such as blood, saliva, sweat, and vomit. Symptoms of the virus include fever, muscle aches, fatigue, and vomiting. In some cases, patients may also develop a rash, red eyes, and hiccups. Treatment of Ebola includes supportive care, such as intravenous fluids, and experimental treatments, such as the monoclonal antibody treatment ZMapp.

INTRODUCTION:

Ebola originally appeared in Sudan and Zaire in 1976, earning its name from the Ebola River in Zaire. Over 284 people were infected during the first Ebola outbreak (Ebola-Sudan), which had a 53% fatality rate. A few months later, Ebola-Zaire, or Yambuku, Zaire, saw the emergence of the second Ebola virus (EBOZ). 318 persons were infected by EBOZ, which had the greatest fatality rate of the Ebola viruses (88%). Despite the enormous impact of skilled and committed researchers, the natural reservoir for Ebola was never found. When sick monkeys were brought into Reston, Virginia, from Mindanao in the Philippines, the third Ebola strain, known as EBOR, was first discovered. Fortunately, none of the few EBOR (seroconverted) patients went on to develop Ebola hemorrhagic fever (EHF). When a female ethologist performing a necropsy on a dead chimpanzee from Tai Forest, Cote d'Ivoire, unintentionally contracted the disease while performing the necropsy, the strain of Ebola that was previously known as Ebola Cote d'Ivoire (EBO-CI) was found in 1994.

The first person to get Ebola.

Thomas Eric Duncan, the first Ebola patient in the United States, passed away at Texas Health Presbyterian Hospital in Dallas on October 8, 2014, at the age of 42. Oct 8, 2015

The first person in the U.S. diagnosed with Ebola dies - HISTORY

Is there a vaccine for Ebola?

There are numerous licensed or under-development Ebola vaccines available to help avoid the disease. rVSV-ZEBOV was the first vaccination to be authorized in the US in December 2019. Under a compassionate use protocol, it had been utilized often in 2018–19**.**

Key Fact

- Humans occasionally contract the severe, frequently fatal disease known as the Ebola virus disease (EVD), formerly known as Ebola hemorrhagic fever.

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- The average EVD case fatality rate is around 50%. Case fatality rates have varied from 25% to 90% in past outbreaks.

- Community engagement is key to successfully controlling outbreaks.

- A variety of interventions, including case care, infection prevention, and control procedures,

surveillance and contact tracing, a top-notch laboratory service, safe and respectable burials, and societal mobilization, are necessary for effective outbreak control.

- The spread of Ebola epidemics in Guinea and the Democratic Republic of the Congo has been slowed down by the use of anti-Ebola vaccines that are currently being developed (DRC).

- Early supportive care combined with symptomatic therapy and rehydration increases survival. A variety of blood, immunological, and pharmacological therapies are being developed, however, there is currently no licensed medication that has been shown to neutralize the virus.

- Women with Ebola who are pregnant or nursing should receive early supportive treatment. The same rules that apply to the non-pregnant population should also apply to vaccine preventive and experimental treatments.

If left untreated, the Ebola virus's acute, devastating sickness frequently results in death. The first two outbreaks of EVD happened simultaneously in 1976, one in Yambuku, DRC, and the other in what is now Nzara, South Sudan. The latter took place in a community close to the Ebola River, which gives the disease its name.

The greatest Ebola outbreak since the virus's discovery in 1976 occurred in West Africa between 2014 and 2016. After beginning in Guinea, the virus spread to Sierra Leone and Liberia through land borders. The ongoing 2018–2019 outbreak in eastern DRC is extremely complex, and public health response efforts are negatively impacted by insecurity.

Cuevavirus, Marburgvirus, and Ebolavirus are the three genera that make up the virus family Filoviridae. There are six known species of Ebolavirus: Zaire, Bundibugyo, Sudan, Ta Forest, Reston, and Bombali. The virus responsible for the current DRC outbreak and the West African outbreak from 2014 to 2016 is a member of the Zaire ebolavirus species.

CAUSE:

EVD in humans is caused by four of five viruses of the genus *Ebolavirus*. The four are the Bundibugyo virus (BDBV), Sudan virus (SUDV), Taï Forest virus (TAFV) and one simply called Ebola virus (EBOV, formerly Zaire Ebola virus).[39] EBOV, species *Zaire ebolavirus* is the most dangerous of the known EVD-causing viruses and is responsible for the largest number of outbreaks.[40] The fifth virus, Reston virus (RESTV), is not thought to cause disease in humans but has caused disease in other primates.[41][42] All five viruses are closely related to marburgviruses.[39]
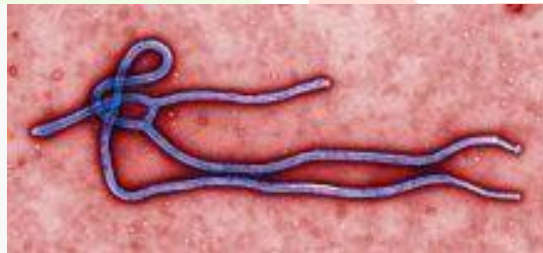
Species Of Ebolavirus

- The virus family Filoviridae includes 3 genera:
  Cuevavirus, Marburgvirus, and Ebolavirus
- There are five species of Ebola virus
  - Zaire ebolavirus
  - Sudan ebolavirus
  - Tai Forest ebolavirus
  - Bundibugyo ebolavirus
  - Reston ebolavirus

Virology

Main articles: Ebolavirus (taxonomic group) and Ebola virus (specific virus)

Ebolaviruses contain single-stranded, non-infectious RNA genomes.[43] *Ebolavirus* genomes contain seven genes including 3'- UTR-*NP-VP35-VP40-GP-VP30-VP24-L*-5'-UTR.[33][44] The genomes of the five
Different ebolaviruses (BDBV, EBOV, RESTV, SUDV, and TAFV) differ in sequence and the number and location of the gene overlap. As with all filoviruses, ebolavirus virions are filamentous particles that may appear in the shape of a shepherd's crook, of a "U" or a "6," and they may be coiled, toroid, or branched.[44][45] In general, ebolavirus is 80 nanometers (nm) in width and may be as long as 14,000 nm.[46]

Their life cycle is thought to begin with a virion attaching to specific cell-surface receptors such as C-type lectins, DC-SIGN, or integrins, which is followed by the fusion of the viral envelope with cellular membranes.[47] The virions taken up by the cell then travel to acidic endosomes and lysosomes where the viral envelope glycoprotein GP is cleaved.[47] This processing appears to allow the virus to bind to cellular proteins enabling it to fuse with internal cellular membranes and release the viral nucleocapsid.[47] The *Ebolavirus* structural glycoprotein (known as GP1,2) is responsible for the virus's ability to bind to and infect targeted cells.[48] The viral RNA polymerase, encoded by the *L* gene, partially uncoats the nucleocapsid and transcribes the genes into positive-strand mRNAs, which are then translated into structural and nonstructural proteins. The most abundant protein produced is the nucleoprotein, whose concentration in the host cell determines when L switches from gene transcription to genome replication. Replication of the viral genome results in full-length, positive-strand antigenomes that are, in turn, transcribed into genome copies of negative-strand virus progeny.[49] Newly synthesized structural proteins and genomes self-assemble and accumulate near the inside of the cell membrane. Virions bud off from the cell, gaining their envelopes from the cellular membrane from which they bud. The mature progeny particles then infect other cells to repeat the cycle. The genetics of the Ebola virus is difficult to study because of EBOV's virulent characteristics.[50]

Electron micrograph of an Ebola virus virion

Signs and symptoms of Ebola[22]

SIGNS AND SYMPTOMS:

...ion period) is ...tes based on ....[24]

...er, weakness, ...usually higher ...al pain, and ...ls to severe ...adaches, and ...area covered

In some cases, internal and external bleeding may occur. This typically begins five to seven days after the first symptoms.[30] All infected people show some decreased blood clotting.[27] Bleeding from mucous membranes or sites of needle punctures has been reported in 40–50% of cases.[31] This may cause vomiting blood, coughing up of blood, or blood in the stool.[32] Bleeding into the skin may create petechiae, purpura, ecchymoses, or hematomas (especially around needle injection sites).[33] Bleeding into the whites of the eyes may also occur.[34] Heavy bleeding is uncommon; if it occurs, it is usually in the gastrointestinal tract.[35] The incidence of bleeding into the gastrointestinal tract has decreased since earlier epidemics and is now[when?] estimated to be approximately 10% with improved prevention of disseminated intravascular coagulation.[29]

- Recovery and death

Recovery may begin between seven and 14 days after the first symptoms.[26] Death, if it occurs, follows typically six to sixteen days from the first symptoms and is often due to low blood pressure from fluid loss.[2] In general, bleeding often indicates a worse outcome, and blood loss may result in death.[25] People are often in a coma near the end of life.[26]

Those who survive often have ongoing muscular and joint pain, liver inflammation, and decreased hearing, and may have continued tiredness, continued weakness, decreased appetite, and difficulty returning to pre-illness weight.[26][36] Problems with vision may develop.[37]

Survivors develop antibodies against Ebola that last at least 10 years, but it is unclear whether they are immune to additional infections.[38]

Transmission

The Pteropodidae family of fruit bats is hypothesized to act as a natural host for the Ebola virus. Close contact with the blood, secretions, organs or other bodily fluids of infected animals, such as fruit bats, chimpanzees, gorillas, monkeys, forest antelope, or porcupines found sick, dead, or in the rainforest, spreads the disease to humans.
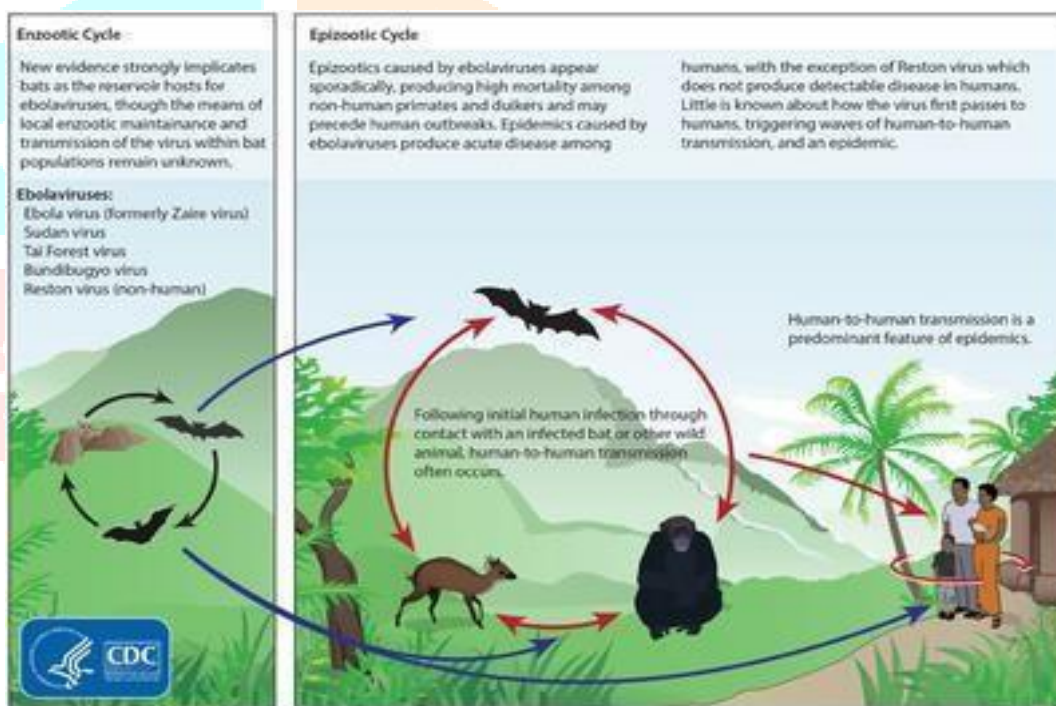

Fig: Life cycle of Ebola Virus

Ebola then spreads from person to person by direct touch (through wounds or damaged mucous membranes) with:

- Blood or body fluids of a person who is sick with or has died from Ebola
- Objects that have been contaminated with body fluids (like blood, feces, vomit) from a person sick with Ebola or the body of a person who died from Ebola

While treating patients with suspected or proven EVD, healthcare personnel have frequently become infected. Close contact with patients when infection control protocols are not carefully followed causes this.

Ebola can also spread through burial rituals that involve coming into contact with the deceased's body.
People remain infectious as long as their blood contains the virus.

Pregnant women who get acute Ebola and recover from the disease may still carry the virus in breastmilk, or pregnancy-related fluids and tissues. This poses a risk of transmission to the baby they carry, and to others. Women who become pregnant after surviving Ebola disease are not at risk of carrying the virus.

If an Ebola patient who is breastfeeding wants to keep doing so, she should be encouraged to do so. Before she can begin, her breast milk must be examined for the presence of Ebola.

For more, read the guidelines on the management of pregnancy and breastfeeding in Ebola.

Diagnosis

Clinically separating EVD from other infectious disorders such as malaria, typhoid fever, and meningitis can be challenging. Pregnancy symptoms and those of the Ebola virus are very similar in many ways. If Ebola is suspected, pregnant women should ideally be tested as soon as possible due to the risks to the unborn child.

Confirmation that symptoms are caused by Ebola virus infection is made using the following diagnostic methods:

Diagnostic test of EVD

- antibody-capture enzyme-linked immunosorbent assay (ELISA) testing
  - ➤ A useful diagnostic test with high specificity
  - ➤ Can be used to confirm the diagnosis along with a positive reverse transcriptase-polymerase chain reaction result
  - • Full blood count
  - • Decreasing platelet count with a low hemoglobin count
  - • Coagulation studies
  - • Prolonged prothrombin time or activated partial thromboplastin

  - antigen-capture detection tests

  - serum neutralization test
  - reverse transcriptase polymerase chain reaction (RT-PCR) assay
  - electron microscopy
  - ·virus isolation by cell culture.

The choice of diagnostic tests should be carefully considered, taking into account technological requirements, disease frequency and prevalence, and the social and medical implications of test results. It is highly advised that diagnostic procedures that have undergone independent, global evaluation be given serious consideration.

- Detecting antibodies against the virus is most reliable in the later stages of the disease and in those who recover.[95] **IgM antibodies** are detectable two days after symptom onset and **IgG antibodies** can be detected six to 18 days after symptom onset.

Diagnostic test of EVD

- o Blood cultures
  - ➢ Negative blood cultures are helpful
- o Ebola-specific IgM and IgG antibodies
  - ➢ IgM antibodies can appear in serum as early as day 2 after infection but results are variable up to day 9.
  - ➢ They become negative between 30 and 168 days after symptom onset
  - ➢ IgG response develops between days 6 and 18 and can persist for several years

- Diagnostic tests evaluated through the WHO Emergency Use Assessment and Listing process

Currently advised tests by the WHO include::

- Nucleic acid assays (NAT) that are automated or partially automated for regular diagnostic management
- Quick antigen detection assays for use in remote locations without easy access to NATs. As part of surveillance efforts, these tests are advised for screening reasons; however, reactive testing should be verified with NATs.

The preferred specimens for diagnosis include:

- Whole blood is drawn from conscious, symptomatic individuals and preserved in ethylenediaminetetraacetic acid (EDTA).
- Oral fluid samples are kept in a universal transport medium when they are taken from dead patients or when drawing blood is not possible.

Laboratory testing on non-inactivated materials should be done under the strictest biological containment measures possible since samples obtained from patients provide a very high biohazard risk. When being transported domestically and internationally, all biological specimens must be packaged utilizing the triple packing system.

Differential diagnosis

Early symptoms of EVD may be similar to those of other diseases common in Africa, including malaria and dengue fever.[25] The symptoms are also similar to those of other viral hemorrhagic fevers such as Marburg virus disease, Congo hemorrhagic, and Lassa fever.[99][100]

The complete differential diagnosis is extensive and requires consideration of many other infectious diseases such as typhoid fever, shigellosis, rickettsial diseases, cholera, sepsis, borreliosis, EHEC enteritis, leptospirosis, scrub typhus, plague, Q fever, candidiasis, histoplasmosis, trypanosomiasis, visceral leishmaniasis, measles, and viral hepatitis among others.[101]

Non-infectious diseases that may result in symptoms similar to those of EVD include promyelocytic leukemia, hemolytic, snake envenomation, clotting factor deficiencies/platelet disorders, thrombotic thrombocytopenic purpura, hereditary hemorrhagic, Kawasaki disease, and warfarin poisoning.[96][102][103][104]

Prevention and Control

Applying a range of interventions—including case care, surveillance, contact tracing, a top-notch laboratory service, safe burials, and societal mobilization—is essential for effective outbreak control. For outbreaks to be successfully controlled, community involvement is essential. Reduced human transmission can be achieved by increasing knowledge of the risk factors for Ebola infection and preventative interventions (such as immunization) that people can adopt. Messages about risk reduction should emphasize several things:

- Reducing the danger of human infection through contact with infected fruit bats, monkeys, apes, forest antelope, or porcupines, as well as from eating their raw meat. When handling animals, gloves and other suitable protective clothes should be worn. Before eating, animal items like meat and blood should be fully prepared.

- Reducing the possibility of transmission from person to person by direct or close contact with those exhibiting Ebola symptoms, particularly through contact with their bodily fluids. When caring for sick patients, gloves and proper personal protective equipment should be worn. Both after visiting patients in the hospital and after providing care for patients at home, regular hand washing is essential.

- Containment strategies for the outbreak, such as safe and respectable burials for the deceased, the identification of those who may have had contact with an Ebola patient and monitoring of their health for 21 days, the significance of separating the healthy from the ill to stop the further spread, and the maintenance of a clean environment.

- The WHO advises male EVD survivors to practice safer sex and hygiene for 12 months following the onset of symptoms or until their semen tests negative for the Ebola virus twice. This recommendation is based on additional analysis of ongoing research and consideration by the WHO Advisory Group on the Ebola Virus Disease Response. Washing with soap and water is advised and contact with bodily fluids should be avoided. Male or female convalescent patients whose blood has tested negative for the Ebola virus are not advised to be isolated, according to WHO.

- Reducing the danger of transmission from fluids and tissue associated with pregnancy, To be able to attend frequent antenatal care (ANC) appointments, manage any pregnancy difficulties, and satisfy their demand for sexual and reproductive care as well as safe delivery, pregnant women who have survived the Ebola virus need the support of the community. Planning for this needs to take into account obstetric and Ebola healthcare skills. Always respect pregnant women's decisions regarding their sexual and reproductive health.

- **Controlling infection in healthcare settings**

Healthcare workers should always take standard precautions when caring for patients, regardless of their presumed diagnosis. These include basic hand hygiene, respiratory hygiene, use of personal protective equipment (to block splashes or other contacts with infected materials), safe injection practices, and safe burial practices.
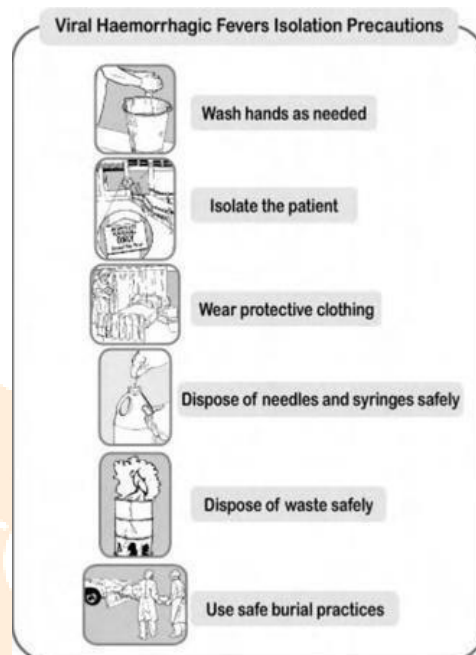
Healthcare professionals caring for patients with the Ebola virus should take additional infection control precautions to avoid contact with the patient's blood and bodily fluids as well as contaminated surfaces and items including bedding and clothing. Healthcare professionals should wear gloves, a clean, non-sterile long-sleeved gown, and facial protection (a face shield or a medical mask and goggles) when nearby (within one meter) to patients with EVD (sterile gloves for some procedures).

Healthcare staff working with ANC or obstetric care should be informed about the risks of persisting virus in pregnancy-related fluids and encouraged to follow protocol for their

Workers in laboratories are also in danger. Human and animal samples collected to examine the spread of the Ebola virus should be handled by competent personnel and processed in laboratories with the appropriate technology.

- **Isolation**

Isolation refers to separating those who are sick from those who are not. Quarantine refers to separating those who may have been exposed to a disease until they either show signs of the disease or are no longer at risk.[122] Quarantine, also known as enforced isolation, is usually effective in decreasing spread.[123][124] Governments often quarantine areas where the disease is occurring or individuals who may transmit the disease outside of an initial area.[125] In the United States, the law allows quarantine of those infected with ebolaviruses.[126][127]

- ## **Care for people who recovered from EVD**

People who recovered from Ebola have experienced several physical repercussions, such as mental health problems. Semen, pregnancy-related fluids, and breast milk are among the bodily fluids where the Ebola virus may linger.

To minimize the risk of further Ebola virus transmission as well as to help Ebola survivors with the medical and psychosocial obstacles they experience, comprehensive support is required. A special program can be established to care for those who have recovered from Ebola to meet these demands.

- For more, read the Guidance on clinical care for survivors of the Ebola virus disease

In certain patients who have recovered from Ebola virus sickness, the Ebola virus is known to persist in immune-privileged locations. These locations include the testicles, the interior of the eye, and the central nervous system. The virus lives on in the placenta, amniotic fluid, and fetus of women who contracted it while carrying a child. Infected women who breastfeed may still have the virus in their milk.

- For more information on pregnant and breastfeeding women recovering from Ebola virus disease please read the Guideline

It is a rare but reported occurrence for someone who has recovered from EVD to experience relapse-symptomatic illness as a result of enhanced virus replication in a particular place. There is still much to learn about the causes of this occurrence.

Reverse transcriptase polymerase chain reaction (RT-PCR) testing for the Ebola virus may yield positive results for the virus for more than 9 months in a tiny percentage of survivors, according to studies on viral persistence.

More surveillance information and analysis of the hazards of sexual transmission are required, particularly regarding the evolution of the prevalence of transmissible and live viruses in semen. In the interim, and in light of the available data, WHO suggests that:

- Until their semen has tested negative twice, all Ebola survivors and their sexual partners should get counseling to guarantee safer sexual behavior. Condoms ought to be made available to survivors.

- Semen testing for male Ebola survivors should be made available 3 months from the disease's commencement, and if they test positive, should be offered every month until their semen tests negative for the virus twice by RT-PCR, with a one-week gap between tests.

- Ebola survivors and their sexual partners should either:
    - abstain from all types of sex, or
    - observe safer sex through correct and consistent condom use until their semen has twice tested negative.

- After testing negative, survivors can resume regular sexual behavior without worrying about spreading the Ebola virus.

- The WHO advises male Ebola virus disease survivors to practice safe sex and hygiene for 12 months following the onset of symptoms or until their semen tests negative for the Ebola virus twice. This recommendation is based on additional analysis of ongoing research and consideration

by the WHO Advisory Group on the Ebola Virus Disease Response.

- Until their semen has tested twice negative for Ebola, survivors should maintain good hand and personal hygiene by washing their hands right away and thoroughly with soap and water after coming into touch with any semen, even after masturbating. To avoid contact with seminal secretions during this time, used condoms should be handled carefully and disposed of safely.

- All survivors, their partners, and their families need to be treated with decency, respect, and compassion.

Treatment

Treatment of specific symptoms and supportive care, such as rehydration with oral or intravenous fluids, increase survival. There is currently no effective treatment for EVD. But a variety of prospective treatments, including immunotherapies, pharmacological therapies, and blood products, are now being examined.

The first-ever multi-drug randomized control trial is being conducted in the ongoing Ebola outbreak in the DRC in 2018–2019 to assess the efficacy and safety of medications used in the treatment of Ebola patients within an ethical framework created in consultation with subject matter experts and the DRC.

Similar to the general population, early supportive care should be provided to Ebola-infected pregnant and nursing women. The same guidelines that apply to the non-pregnant population should also be followed while providing experimental treatments.

Zmapp:

- The best-known emerging treatment so far, ZMapp, is a combination of three humanized monoclonal antibodies targeted at three Ebola virus glycoprotein epitopes and is engineered for expression in tobacco plants.
- Zmapp had proved protective when given to non-human primates 24-48 hours after infection.
- It has not yet been tested in humans for safety or efficacy.
- The whole study is supported by the US govt.

TKM-Ebola

- TKM-Ebola consists of a combination of small interfering RNAs that target Ebola virus RNA that target Ebola virus RNA polymerase L, formulated with lipid nanoparticle technology.
- It is protective in non-human primates (guinea, pigs, and monkeys)
- The US Food and Drug Administration has granted expanded access to this drug under an Investigational New Drug application (INDA)
- Under emergency protocols, it had given to a small number of patients in Zaire.

Brincidofovir

1. Formerly known as CMX-001, brincidofovir is currently undergoing phase III trials for the treatment of cytomegalovirus and adenovirus.
2. It also shows activity against Ebola virus in vitro.
3. The drug has been used in patients with Ebola virus infection in the US under Emergency Investigational New Drug applications approved by the FDA.

Favipiravir

- Formerly known as T-705, favipiravir selectively inhibits viral RNA dependent RNA polymerase
- It is active against influenza viruses, West Nile virus, yellow fever virus, foot and mouth disease virus, as well as other flaviviruses arenaviruses, bunyaviruses
- It is effective against Ebola virus in mouse models
- Human trials are started in west Africa

BCX-4430

- BCX-4430 is an adenosine analog that is active against the Ebola virus in rodents.

- It is thought to act through the inhibition of viral RNA-dependent RNA polymerase

AVI-7537

- AVI-7537 consists of antisense phosphorodiamidate morpholino oligomers (PMOs) that target the Ebola virus VP24 gene.
- It confers a survival benefit to Ebola virus-infected non-human primates
- AV-7537 has undergone Phase I clinical studies.

Vaccines

In a significant trial in Guinea in 2015, an investigational Ebola vaccine demonstrated substantial levels of protection against EVD. A trial including 11 841 persons was conducted to examine the vaccine, known as rVSV-ZEBOV. No Ebola cases among the 5837 recipients of the vaccine were discovered 10 days or more after receiving it. Comparatively, among individuals who did not receive the vaccine, there were 23 cases 10 days or later.

In the ongoing Ebola outbreak in the DRC that began in 2018-2019, the rVSV-ZEBOV vaccine is being used. Women who are pregnant or in nursing should be able to get the vaccine under the same circumstances as the general public.

Initial data indicate that the vaccine is highly effective.

WHO's Strategic Advisory Group of Experts has stated the need to assess additional Ebola vaccines.

Interim advice on the sexual transmission of the Ebola virus disease

Vaccine

- cAd3-ZEBOV (also known as the NIAID/GSK Ebola vaccine or cAd3-EBO z) is an experimental vaccine for two ebolaviruses, Ebola virus and Sudan virus, developed by scientists at GlaxoSmithKline (GSK) and tested by National Institute of Allergy and Infectious Disease (NIAID).
- The vaccine is derived from Chimpanzee adenovirus, chimp adenovirus type 3 (chAd3) genetically engineered express glycoprotein from Zaire

Vaccine (cont'd)

- rVSV-EBOV is an experimental vaccine for the Ebola filovirus, developed by scientists at the Canadian National Microbiology Laboratory.
- rVSV-ZEBOV is an attenuated vesicular stomatitis virus with one of its genes replaced by an Ebola virus gene.
- Human trials have started in the US

WHO response
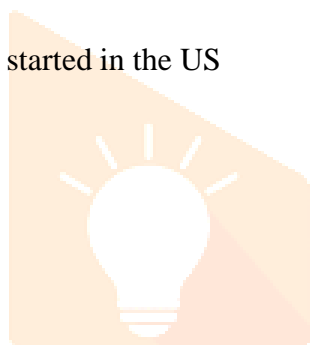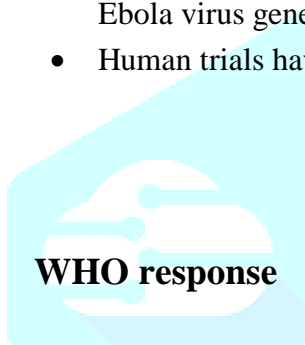
- WHO supports at-risk nations in creating preparation plans and maintains surveillance for the Ebola virus disease to stop outbreaks. The following document offers general recommendations for managing Ebola and Marburg virus outbreaks:

Ebola and Marburg virus disease epidemics: preparedness, alert, control, and evaluation

In response to an outbreak, WHO supports community involvement, illness identification, contact tracing, immunization, case management, laboratory services, infection control, logistics, and training and support for safe and respectful burial practices.

WHO has developed detailed advice on Ebola infection prevention and control:

- Instructions on infection prevention and control for treating patients in hospitals who have been diagnosed with or think they have Filovirus hemorrhagic fever, with an emphasis on Ebola Research.

Treatments

- *Main article: Ebola virus disease treatment research*

1. Scientists examining slides of cultures of cells that produce monoclonal antibodies. The products of these lab-grown plants are being examined by researchers to see which ones are the most promising.

- As of July 2015, no medication has been proven safe and effective for treating Ebola. By the time the Ebola virus epidemic in West Africa began in 2013, there were at least nine different candidate treatments. Several trials were conducted in late 2014, and early 2015, but some were abandoned due to a lack of efficacy or a lack of people to study.[246]
- As of August 2019, two experimental treatments known as REGN-EB3 and mAb114 were found to be 90% effective.[247][248][249]

Diagnostic tests

- The diagnostic tests currently available require specialized equipment and highly trained personnel. Since there are few suitable testing centers in West Africa, this leads to delays in diagnosis.[250]

- On 29 November 2014, a new 15-minute Ebola test was reported that if successful, "not only gives patients a better chance of survival, but it prevents transmission of the virus to other people." The new equipment, about the size of a laptop and solar-powered, allows testing to be done in remote areas.[251]
- On 29 December 2014, the U.S. Food and Drug Administration (FDA) approved the LightMix Ebola Zaire RRT-PCR test for patients with symptoms of Ebola.[252]

Disease models

- Animal models and in particular non-human primates are being used to study different aspects of the Ebola virus disease. Developments in organ-on-a-chip technology have led to a chip-based model for Ebola hemorrhagic syndrome.[253]

CONCLUSION:-

Since its discovery in 1976, the Ebola virus has posed a concern to human health due to its hazardous, extremely deadly, and contagious characteristics. The most lethal hemorrhagic fevers that have been detected are Ebola and hepatitis C, both of which lack a known cure. Humans spread diseases mostly through the interchange of blood and bodily fluids. Inadequate hygiene procedures and hospital-acquired infections are two other obvious mechanisms of transmission. There is a pressing need for training programs for doctors, nurses, and other hospital staff as well as for information distribution to the local population.

Future efforts must place a focus on comprehending the variations among ebolavirus species. More field research into the ecology of reservoir species and shedding practices is urgently needed. It is necessary to conduct a more in-depth study into the pathophysiology of ebola virus infection in laboratory animals to identify fresh targets for therapeutic strategies. Preventing the transmission of the disease is the greatest way to reduce the number of cases and the pandemic. To raise knowledge of the disease and encourage its elimination, awareness activities should be undertaken on a big basis. The development of quick and easy diagnostic tools for ebola infection should be the main focus of the study as well.

The project's anticipated result is that research would lead to the creation of a conveniently accessible and reasonably priced medicine for the treatment of the Ebola virus. The transition of prospective medications and vaccines from the lab to clinical testing, and eventually the treatment of ebola patients, requires a significant effort and a well-defined plan.

The Ebola virus is one of the most deadly ailments known to mankind due to its high mortality rate (up to 90%) accompanying the disease. Ebola hemorrhagic fever (EHF) is an infectious disease of animals that can be transmitted to both human and non-human primates. The first epidemic of EHF occurred in 1976 in the Democratic Republic of the Congo. The incubation period of ebola is less than 21 days. Ebola virus infections are depicted by immune suppression and a systemic inflammatory response that leads to damage to the vascular, coagulation, and immune systems, causing multi-organ failure and shock. Five genetically distinct members of the Filoviridae family responsible for EHF are as follows: Zaire ebolavirus, Sudan ebolavirus, Cote d'Ivoire ebolavirus, Bundibugyi ebolavirus, and Reston ebolavirus. The 2014 West Africa ebola epidemic has been considered the most serious panic in the medical field concerning the number of human cases and death toll. The natural host for the ebola virus is unknown, thus it is not possible to carry out programs to regulate or abolish virus transmission to people. The Ebola virus infection provides little chance to develop acquired immunity causing rapid progression of the disease. It is pertinent to mention that there is no more antiviral therapy or vaccine that is helpful against ebola virus infection in humans. The impediment of EHF necessitates a much better understanding of the epidemiology of the disease, particularly the role of wildlife, as well as bats, in the spread of the Ebola virus to humans.

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