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EBOLA DISEASE, TREATMENT AND PREVENTION: A SHORT INTRODUCTION

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ABSTRACT
*Ebola is a virus (**Family**: Filoviridae) which was first seen in African continent. From wild animals the ebola virus is transmitted and spreads in the human population. The virus can directly contact with body fluids, the mucous membrane, secretions or broken skin of an infected person and severel symptoms like high fever, continuous bleeding, shock etc. At first the infection was seen in African countries, but in recent time the virus has spread all over the world. There are no vaccines for the treatment of Ebola so far, only supportive therapies are use to minimise the harmful affect from ebola.*

Keywords: Ebola, virus, Africa, shock, bleeding, vaccine.

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INTRODUCTION

The disease Ebola is caused by infection with Ebola virus, which was first discovered in Africa in 1976. Ebola hemorrhagic fever (Ebola HF) is a severe, often-fatal disease in humans and nonhuman primates (monkeys and chimpanzees) that has appeared sporadically .It kills up to 90%of people who are infected [1]. This disease caused by one of five different Ebola viruses. Four viruses badly caused illness in both human and animals. The Ebola viruses cause bleeding inside and outside the body by damaging the immune system [2].

Infection of Ebola virus
↓
Damaging immune system
↓
Damaging different organs
↓
Decreased blood clotting factors
↓
Severe internal and external bleeding

The first case of Ebola infection came from northern Zaire in central Africa in 1976.the virus was first recognised at Ebola river. So, researchers named the virus as Ebola [3, 4].

Symptoms of Ebola [4, 5]

The signs and symptoms of Ebola HF are not the same for all patients. The table below outlines symptoms of the disease, according to the frequency with which they have been reported in known cases.

Table1: Symptoms that Occur in Most Ebola Patients [4, 5, 6]

Within a few days of becoming infected with the virus:	Within one week of becoming infected with the virus:
-High Fever - Headache -Muscle Aches - Stomach Pain -Fatigue, -Diarrhoea	-Chest Pain -Shock And Death

Table2: Symptoms that Occur in Some Ebola Patients

Within a few days of becoming infected with the virus:	Within one week of becoming infected with the virus:
-Sore Throat -Hiccups -Rash -Red And -Itchy Eyes -Vomiting Blood -Bloody Diarrhoea	-Blindness -Bleeding

About Ebola Virus

Disease Agent:

-Ebola virus

Disease Agent Characteristics:

Family: *Filoviridae*;

Genus: *Ebolavirus*

Morphology and Size of Ebola Virus: Enveloped, helical, pleomorphic virions that are flexible with extensive branching, 80 nm in diameter and 970-1200 nm in length.

Nucleic Acid: Nucleic acid of ebola virus is linear, negative-sense. Single-stranded RNA found in Ebola virus which about 18,900 kb in length

Physicochemical Properties: Stable at room temperature and can resist heat; inactivated at 60°C for 30 minutes; by the help of UV light and gamma irradiation, infection of ebola virus reduced. Reduction or damaged of ebola virus occurs in lipid solvents, b-propiolactone, formaldehyde, sodium hypochlorite, and phenolic disinfectants.

Rout of Spread [7, 8, 9]

-Body fluids of a person who is sick with or has died from Ebola. (Blood, vomit, pee, poop, sweat, semen, spit, other fluids)
-Objects contaminated with the virus (needles, medical equipment)
- Infected animals (by contact with blood or fluids or infected meat)

Table3: Transmission of Ebola virus according to type of contact with an infected patient

Very low or no recognised risk	Low risk	High risk
Casual contact with a feverish, ambulant, self-caring patient. Examples: sharing a sitting area or public transportation; receptionist tasks.	Close face-to-face contact with a feverish and ambulant patient. Example: physical examination, measuring temperature and blood pressure.	Close face-to-face contact without appropriate personal protective equipment (including eye protection) with a patient who is coughing or vomiting, has nosebleeds, or who has diarrhoea. Percutaneous, needle stick or mucosal exposure to virus-contaminated blood, body fluids, tissues or laboratory specimens in severely ill or known positive patients

Classification of Ebola Virus
Five species of the genus Ebola virus (Filoviridae family) have been identified.

- Zaire ebolavirus

- Sudan ebolavirus,

-Reston ebolavirus,

-Tai Forest ebolavirus

- Bundibugyo ebolavirus.

Four of the strains can cause severe illness in humans as well as in animals. The Reston virus, has caused illness in some animals, but not in humans. The case-fatality ratio for Zaïre ebolavirus infections is estimated to be between 50% and 90%.

Pathogenesis of Ebola [3]
Pathogenicity of ebola virus have not been clearly known due to difficulty in obtaining samples and studying the disease in the relatively remotes areas in which the disease occurs. Large number of biohazard materials is required to perform laboratory and clinical studies.

The genome of ebola virus about 19 kb long, the genome is consist of seven open reading frames which encodes structural proteins, envelope of glycoprotein (GP), nucleoprotein and matrix protein. The glycoprotein of ebola virus plays a major role in ebola virus infection. GP allows the virus to introduce its materials into monocytes and macrophages. Then body defence mechanism activated and release cytokines, after the release of cytokinine, cytokines associated with inflammation as well as fever. In the other hand, endothelial cells are losses vascular integrity. Infection of endothelial cells also induces a cytopathic effect and damage to the endothelial barrier that together with cytokines effects, leads to the loss of vascular integrity, when the ebola virus progress in endothelial cells of human umbilical vein, amount of cell adhesion molecule (integrin) tremendously reduced and immune molecules on the cell surface. Virus infection and cytokinines dysregulation are the main reasons of the disease. These two promotes haemorrhage and vasomotor collapse.

Prevention
• Avoiding contact with patients and/or their bodily fluids
• Avoiding contact with corpses and/or bodily fluids from deceased patients
• Avoiding contact with wild animals (including monkeys, forest antelopes, rodents and bats), both alive and dead, and consumption of 'bush meat'
• Washing hands regularly, using soap or antiseptics

• Washing and peeling fruit and vegetables before consumption
• Practising 'safe sex'
• Avoiding habitats which might be populated by bats, such as caves, isolated shelters, or mining sites
• Avoiding unessential travel to affected countries
• Identify appropriate in-country healthcare resources in advance of travelling, through local business contacts, friends or relatives
• Ensure that, in the event of any illness or accident, medical evacuation is covered by travel insurance, to limit exposure in local health facilities.

Some Recent Statistics about Ebola [2, 3]
As of 27 July 2014, 1323 infection cases are reported in the three countries (Guinea, Liberia and Sierra Leone) including 729 deaths. This includes one case exported from Liberia to Nigeria. The distribution and classification of the cases are as follows, based on best available information reported by ministries of health through the World Health Organization, Regional Office for Africa:
➢ Guinea: 460 cases (336 confirmed, 109 probable, and 15 suspected), including 339 deaths; case-fatality rate = 74%
➢ Liberia: 329 cases (100 confirmed, 128 probable, and 101 suspected), including 156 deaths; case-fatality rate = 47%
➢ Sierra Leone: 533 cases (473 confirmed, 38 probable, and 22 suspected), including 233 deaths; case-fatality rate = 44%
➢ Nigeria: one probable fatal case that was imported from Liberia.

Treatment of Ebola Virus [8, 9]
There are no vaccines for the treatment of ebola so far. Researchers are doing their job to discover some vaccines as well as some medicines, but it will take some time. Some vaccines are in the trial and testing process but not yet ready for medical use. Some supportive treatments are given
• To Maintain body fluids and electrolytes in the patient's body
• To Maintain oxygen level of the body
• To Maintaining blood pressure
• To relief from pain
• To kill bacterial infections in the body,different types of antibacterial drugs are used.

ZM app is a experimental drugs of ebola virus which having some potency to treat ebola like viruses, seems to have saved their lives. The drug, developed by a San Diego firm, but this drug never been tried before on humans, but it showed promise in small experiments on monkeys.

CONCLUSION
In the present scenario, the ebola virus making headlines not only Africa but all over the world. How a virus making sensation, we all have seen in

recent time. We all hope, researchers giving a quick solution to treat or kill ebola virus and every individual taking preventive measures from ebola virus.

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