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ANALYSIS OF BODILY FLUIDS AND FOMITES IN  
TRANSMISSION OF EBOLA VIRUS USING BIGDATA

Jemimah C<sup>a</sup>, Lilly Sheeba S<sup>b</sup>

<sup>a</sup>PG Student, Jerusalem College of Engineering, Chennai

<sup>b</sup>Assistant Professor, Jerusalem College of Engineering, Chennai

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**Abstract**

Ebola virus is a highly contagious haemorrhagic fever which has led to the recent destruction in parts of Africa where nearly half of the population of Africa has been eroded. While measures were taken to halt the transmission of the disease, the modes of transmission of the virus were detected. Fomites were seen as the physical modes of transmission from the infected wards of the ebola patients while the bodily fluids in the fomites are responsible for the healthy human to be infected. The fluids such as tears, blood and urine are secreted from the organs such as eyes, heart and kidney where they are filled within those organs which leads to the damage of the entire organs. Other fluids such as the nasal blood, breast milk and sweat are from nose, gonads and skin while saliva, semen, vomit, sputum, stool are also responsible for the transmission of the ebola virus. The fomites such as the doctor's blood stained gloves and the bloody intravenous insertion site carry the ebola virus through the bodily fluids. This helps in preventing the wide spread of the fatal haemorrhagic fever, ebola.

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*Keywords:* Bigdata; Ebola; Fatality; Fluids; Fomites; Organs.

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## 1. INTRODUCTION

Why is the current population in Africa is only half of the population that was found before the year 2014? Why people from Africa have been quarantined and are unable to travel to other places like any other country people? It was a great shock to the people of Africa when they had to lose their people because of the fatal haemorrhagic fever, ebola. It was necessary to save these people from the deadly disease which was very contagious. Thus the idea arose to find out the modes of transmission of the virus. This must be accessed only through the ebola infected people and their surroundings. It was found that through the bodily fluids of the ebola infected person the disease spread to other healthy people. Research was also conducted where the ebola patients were treated and thus few fomites also were found to be behind the infection of the contagious haemorrhagic fever. All these data required large space to be stored and analysed which also may be processed and retrieved later to find a solution to this problem which led to the arousal of bigdata in this case. Making predictions about the disease based on the real-time data gathered from the hospitals will change the current scenario in the case of ebola [8]. Improvising the speed of data analysis by having the factors that lead to the widespread of the disease helps to save the people who are suffering from the disease and later also people who will be attacked by the disease. For such large amount of data, data mining cannot provide solution. As the days go by, the fatality rate of the people affected by ebola is on the increase. Thus we find solution to prevent the disease rather than being affected and then suffer with the disease.

The most popular ways in which ebola are affected are from the endothelial cells [9], semen [11], and blood products [14]. It is easy to analyse the infection but difficult to prevent the wide spread of these disease from the sources. This paper explains the physical modes of transmission of the disease from one person to another by which they can help in preventing the disease from affecting the people.

**Modes of transmission of the Ebola Virus:** The fluids and fomites that have been found to transmit the disease is found to affect the organs such as the eyes, heart, kidney, lung and the liver. Later components such as the doctor's blood stained gloves and the bloody intravenous insertion site are the physical modes of transportation of the virus.

## 2. Requirements

### 2.1 Fluids

The contagious diseases are generally either airborne or waterborne. When ebola virus is been considered, it is proved that it is transmitted through the bodily fluids such as saliva, stool, semen, breast milk, urine, vomit, sputum, tears, nasal blood, and a skin swab(sweat). Through the given fluids the caregivers and the family members can be affected. To prevent this the caregivers are given coats, helmets, aprons, gloves and shoes so that the virus in these body fluids cannot affect them. All the visitors of the patient might also be given some precautionary equipment to guard themselves from the fatal disease. Blood has all the contents of the virus which is the direct way of transmission and therefore before blood donation, it should be carefully tested for infections such as ebola.

Table 1. Virus culture and results from 54 clinical samples collected from 26 patients with laboratory-confirmed Ebola hemorrhagic fever.

Sample type, Phase of illness	Patients No.	Samples No.	Day after disease onset that sample was collected, range (mean)	Virus culture positive, no. (% sample type tested)	No./total tested (%)	Latest day positive after disease onset
<b>Saliva</b>						
Acute	10	12	4 – 14 (6)	1 (8)	8/12 (67)	8
Convalescent	4	4	12 – 23 (16)	0 (0)	0/4 (0)	-
<b>Skin</b>						
Acute	7	8	4 – 10 (7)	0 (0)	1/8 (13)	6
Convalescent	3	3	7 – 15 (12)	0 (0)	0/3 (0)	-
<b>Urine</b>						
Acute	6	7	5 – 22 (14)	0 (0)	0/7 (0)	-
Convalescent	4	4	8 – 40 (28)	0 (0)	0/4	-
<b>Vomit</b>						
Acute	1	1	NA (9)	0 (0)	0/1 (0)	-
Convalescent	1	1	NA (20)	0 (0)	0/1 (0)	-
<b>Sputum</b>						
Acute	1	1	NA (8)	0 (0)	0/1 (0)	-

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