Research Journal of Pharmacy and Technology

ISSN

0974-360X (Online)
0974-3618 (Print)

Ebola Virus- A Review (AbstractView.aspx?PID=2016-9-5-30)

Author(s): Hemashree S (search.aspx?key=Hemashree S), Rubini K R (search.aspx?key=Rubini K R), Sabin Lohala (search.aspx?key=Sabin Lohala), Nithya S (search.aspx?key=Nithya S)

Email(s): sermugapandian.nithya@gmail.com (mailto:sermugapandian.nithya@gmail.com)

DOI: 10.5958/0974-360X.2016.00118.9 (https://doi.org/10.5958/0974-360X.2016.00118.9)

Address: Hemashree S1, Rubini K R1, Sabin Lohala2, Nithya S*
School of Pharmaceutical Sciences, Vels University (VISTAS), Velan Nagar, P.V. Vaithyalingam Road, Pallavaram, Chennai - 600 117. Tamil Nadu, India.
*Corresponding Author

Published In: Volume - 9, Issue - 5, Year - 2016 (Issues.aspx?VID=9&IID=5)

Keywords: Ebola virus () fatal () epidemic () clinical manifestation () pathogenesis. ()

Cite this article:
Hemashree S, Rubini K R, Sabin Lohala, Nithya S. Ebola Virus- A Review. Research J. Pharm. and Tech. 2016; 9(5): 617-620. doi: 10.5958/0974-360X.2016.00118.9

View PDF

Ebola Virus- A Review

Hemashree S[1], Rubini K R[1], Sabin Lohala[2], Nithya S*

School of Pharmaceutical Sciences, Vels University (VISTAS), Velan Nagar, P.V. Vaithyalingam Road, Pallavaram, Chennai - 600 117. Tamil Nadu, India.

*Corresponding Author E-mail: **sermugapandian.nithya@gmail.com**

Received on 21.03.2016 Modified on 04.04.2016
Accepted on 28.04.2016
Research J. Pharm. and Tech. 2016; 9(5): 617-620.
DOI: 10.5958/0974-360X.2016.00118.9

ABSTRACT:
Ebola virus is formerly designated zaire ebola virus which is one of the known genus ebola virus caused by filoviridae. The four of five known ebolavirus including EBOV, caused a severe and often fatal hemorrhagic(bloody) fever. In human and mammals which are found prevalent in Guinea, Liberia, Sierra and at present epidemic in west Africa which resulted in at least 28638 suspected cases and 11315 confirmed deaths. Ebola virus has caused majority of human deaths from EVD. In this review we have summarized the EVD organization, clinical manifestation and pathogenesis.

KEYWORDS: Ebola virus, fatal, epidemic, clinical manifestation, pathogenesis.

INTRODUCTION:

A notoriously deadly virus that causes foursome symptoms, the most prominent being high fever and massive internal bleeding ebola virus kills as many as 90%of the people it infects. It is one of the virus that is capable of causing hemorrhagic(bloody) fever(1,2).

Epidemiology:

From 1976-2013, WHO reported 1716 confirmed cases. The largest outbreak in 2014. Wes Africa Ebola virus outbreak which was affected Guinea, Sierra Leone, Liberia, Nigeria, 2127 cases have been identified with 1145 deaths. From 1995-2013 second major outbreak occurred(3).

History:

Ebola virus was first isolated in 1976 during outbreaks of Ebola hemorrhagic fever in Congo and Sudan. The Congo had one of the highest case fatality rates of any human virus 50 to 90%. The name of the disease originates from the Congo which lies on the Ebola river(3,4).

It is primarily considered as a local self- limiting problem with a very high case fatality ratio. Until the end of the eighties there were only remarkable EVD outbreaks (4–7). Changing frequency clearly showed an increase in the risk of development of the EVD outbreak in the next years. Some variability in Case Fatality Ration (CFR) was observed across different outbreaks and a decrease associated with the increase in generations of person to person passage(5,7,8). From December 2013 to August 11, 2015, a total of 20,035 confirmed and probable cases of Ebola virus disease (EVD) were reported in Guinea, Liberia, and Sierra Leone. There have been concerns that the different cultural roles or physiology of male and female persons may have resulted in the sexes being differently affected during this outbreak(9).

***Sign and symptoms*:**

The following 2 types of exposure history are recognized

1. **Primary exposure:**This is typically involves traveler to or work in an Ebola endemic area.(10–12)

2. **Secondary exposure:** this refers to human to human exposure(eg. Medical caregivers, family caregivers, person who prepared diseased patient for burial primate to care for primates),or person who collect or prepare bush meat for human consumption.

Physical findings depend on the stage of disease at the time of presentation with African derived ebolavirus infected. There is an incubation period (typically 3-8days) in primary cases and slightly longer in secondary cases.

Symptoms of EVD may appear 2-21days after exposure to the Ebola virus, according to WHO on an average however

Symptoms of EVD may appear 2-21days after exposure to the Ebola virus, according to WHO on an average however, symptoms appear within 8-10days.

At first Ebola symptoms seems like those of many other viruses. According to the CDC the patient will usually experience the following symptoms.

A fever greater than 101.5degree Fahrenheit
Muscle pain
Severe headaches
Weakness
Diarrhea
Vomiting
Abdominal pain

Some patients also bleed from the nose and mouth this is called hemorrhagic syndrome and usually occurs only in the late stages of the disease. Typically the ebolavirus causes hemorrhagic syndrome in 30-50%.ofthe patients.

Early finding may include

- Pharyngilis
- Maculopapular rash
- Bilateral conjunctival infection
- Later finding may include
- Expressionless facies
- Bleeding from (IV) puncture sites and mucous membrane
- Myocarditis and pulmonary edema
- In terminally ill patient tachypnea ,HTN, anuria and coma

Diagnosis:
Symptoms that occur in advanced stages of EVD include rash and symptoms of impaired kidney and liver function such as blood in stool according to WHO.

Because of the symptoms of ebola virus are so much like those of other disease. Medical professionals use a series of tests to diagnose EVD(13). According to WHO common tests include the following

a. Virus isolation by cell culture

b. ELISA

c. Serum neutralization test

d. Antigen capture detection test

e. Electron microscopy

f. Reverse transcriptase polymerase chain reaction(RT-PCR) assay

g. Basic blood tests: complete blood count with differential bilirubin, liver enzymes, blood urea nitrogen(BUN), creatinine, PH(16–18)

h. Studies for isolating the virus: tissue culture(only to be performed in one of a few high containment laboratory throughout the world), reverse transcription polymerase chain reaction (RT-PCR) assay

i. Serologic testing: ELISA for antigens or for IgM and IgG antibodies

Viral reservoirs:
Perhaps the greatest mysterious regarding filoviruses are the identity of their natural reservoir and mode of transmission to wild apes and humans. However as the data suggest that bat are least one of the reservoir host of ebolavirus in Africa. (14

wild apes and humans. However as the data suggest that bat are least one of the reservoir host of ebolavirus in Africa. (14-16)

Transmission

Epidemics of ebola virus disease are generally thought to begin when an individual becomes infected through contact with meat or body fluids of an infected animal(17–21). Once the patients gets ill or they dies, the virus spreads to others who come into direct contact with the infected individuals blood, skin and other body fluids, the studies in laboratory primates have found that animals can be infected with ebola virus through droplet inoculation of virus into the mouth or eyes suggesting to human infection can result from the inadvertent transfer of virus to these sites from contaminated hands. (22,23)

Person to person:

Person to person transmission associated with direct contact with symptomatic individuals with ebolavirus disease and direct contact with body fluids from patients to EVD.

Risk of transmission through different body fluids:

Transmission is mostly like to occur through direct contact of broken skin or unprotected mucous membranes with virus containing body fluids from a person who has sign and symptoms.

The risk of Ebola transmission also depends upon the quantity of virus in the fluid. During the early phaseof illness the amount of virus in the blood may be quite low but levels then increase rapidly and may exceed 10 to the power 8 RNA copies per ml serum in severely ill patient.(24,25)

- Risk of transmission through contact with contaminated surfaces
- Risk of airborne transmission
- Nosocomial transmission
- Transmission with animals
- Immune response to ebolavirus infection:

Ebola virus replicates at usually high rate that overwhelms the protein synthesis apparatus of infected cells and host immune defenses. Both the adaptive immune and inflammatory system respond to infection at the same time that some cell types specifically monocytes and macrophages are targets relevant to disease pathogenesis. This feature of the infection was initially suggested bythe immune histochemical localization of ebola virus in ivvo endothelial cells mononuclear phagocytes and hepatocytes are the main targets of infection.(26,27)

Vaccine development:

Several animal models have been developed to study the pathogenesis of Ebola virus infection and to assess the efficacy of various vaccine approaches.(28–30)

Genetic immunization with plasmid DNA was developed in the Guinea pig and that was the first vaccine for ebola virus.

In summary, an understanding the mechanisms underlying ebola virus induced cytopathic effects has facilitated the process of vaccine and antiviral therapy development which has in turn provided new information about pathogenesis and the immune response.(31–35)

Prevention:

Prevention focuses on avoiding contact with the viruses. The following precautions can help prevent infection and spread of Ebola and Marburg.

1. Avoid areas of known outbreaks
2. Wash your hands frequently
3. Avoid bush meat
4. Avoid contact with infected people
5. Follow infection control procedures
6. Don’t handle remains.

Treatment and drugs

No antiviral medications have proved effective in treating infection with either virus. Supportive hospital care includes

a. Providing fluids

b. Maintaining B.P

c. Providing oxygen as needed

d. Replacing lost blood

e. Treating other infections that develop(36–38)

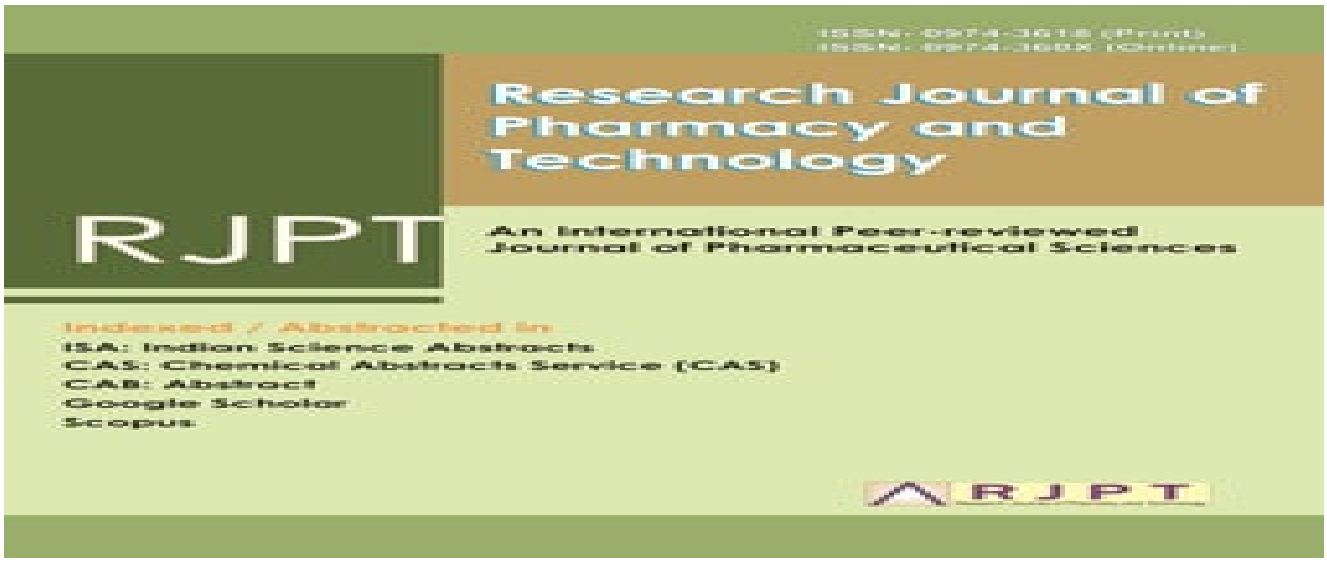
CONCLUSION*:*

Hence, the Ebola virus is studied from various review articles and innovation of the new medication is on the way to medication. Most of the researchers are on the way pre clinically and some of them are succeeded but not clinically approved by FDA and WHO.

REFERENCES:

1. Grard G, Fair JN, Lee D, Slikas E, Steffen I, Muyembe J-J, et al. A Novel Rhabdovirus Associated with Acute Hemorrhagic Fever in Central Africa. PLoS Pathog [Internet]. 2012 Sep [cited 2016 Mar 19];8(9). Available from: http://www.ncbi.nlm.nih.gov/pmc /articles/PMC3460624/
2. Mupere E, Kaducu O, Yoti Z. Ebola haemorrhagic fever among hospitalised children and adolescents in nothern Uganda : Epidemiologic and clinical observations. Afr Health Sci. 2001 Dec;1(2):60–5.
3. Harrod KS. Ebola: history, treatment, and lessons from a new emerging pathogen. Am J Physiol - Lung Cell Mol Physiol. 2015 Feb 15; 308(4):L307–13.
4. Kugelman JR, Lee MS, Rossi CA, McCarthy SE, Radoshitzky SR, Dye JM, et al. Ebola Virus Genome Plasticity as a Marker of Its Passaging History: A Comparison of In Vitro Passaging to Non-Human Primate Infection. PLoS ONE [Internet]. 2012 Nov 28 [cited 2016 Mar 19];7(11). Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3509072/
5. Ebola: The Natural and Human History of a Deadly Virus. - PubMed - NCBI [Internet]. [cited 2016 Mar 20]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25520259
6. De Clercq E. Interferon: ten stories in one. A short review of some of the highlights in the history of an almost quinquagenarian. Acta Microbiol Immunol Hung. 2005;52(3-4):273–89.
7. Li YH, Chen SP. Evolutionary history of Ebola virus. Epidemiol Infect. 2014 Jun;142(6):1138–45.
8. Ebola Virus Disease Outbreak in Isiro, Democratic Republic of the Congo, 2012: Signs and Symptoms, Management and Outcomes [Internet]. [cited 2016 Mar 19]. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4479598/
9. Hartman AL, Towner JS, Nichol ST. Ebola and Marburg Hemorrhagic Fever. Clin Lab Med. 2010 Mar;30(1):161–77.
10. Moole H, Chitta S, Victor D, Kandula M, Moole V, Ghadiam H, et al. Association of clinical signs and symptoms of Ebola viral disease with case fatality: a systematic review and meta-analysis. J Community Hosp Intern Med Perspect. 2015;5(4):28406.
11. Kratz T, Roddy P, Tshomba Oloma A, Jeffs B, Pou Ciruelo D, de la Rosa O, et al. Ebola Virus Disease Outbreak in Isiro, Democratic Republic of the Congo, 2012: Signs and Symptoms, Management and Outcomes. PloS One. 2015;10(6):e0129333.
12. Epstein L, Wong KK, Kallen AJ, Uyeki TM. Post-Ebola Signs and Symptoms in U.S. Survivors. N Engl J Med. 2015 Dec 17;373(25):2484–6.
16. Jansen van Vuren P, Grobbelaar A, Storm N, Conteh O, Konneh K, Kamara A, et al. Comparative Evaluation of the Diagnostic Performance of the Prototype Cepheid GeneXpert Ebola Assay. J Clin Microbiol. 2016 Feb;54(2):359–67.
17. Ghani AC, Burgess DH, Reynolds A, Rousseau C. Expanding the role of diagnostic and prognostic tools for infectious diseases in resource-poor settings. Nature. 2015 Dec 3;528(7580):S50–2.
18. Nouvellet P, Garske T, Mills HL, Nedjati-Gilani G, Hinsley W, Blake IM, et al. The role of rapid diagnostics in managing Ebola epidemics. Nature. 2015 Dec 3;528(7580):S109–16.
19. Park DJ, Dudas G, Wohl S, Goba A, Whitmer SLM, Andersen KG, et al. Ebola Virus Epidemiology, Transmission, and Evolution during Seven Months in Sierra Leone. Cell. 2015 Jun 18;161(7):1516–26.
20. Osterholm MT, Moore KA, Kelley NS, Brosseau LM, Wong G, Murphy FA, et al. Transmission of Ebola Viruses: What We Know and What We Do Not Know. mBio [Internet]. 2015 Feb 19 [cited 2016 Mar 19];6(2). Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4358015/
21 The Effect of Community-Based Prevention and Care on Ebola Transmission in Sierra Leone. - PubMed - NCBI [Internet]. [cited 2016 Mar 21]. Available from: http://www.ncbi.nlm.nih. gov/pubmed/26890176
22. Mann E, Streng S, Bergeron J, Kircher A. A Review of the Role of Food and the Food System in the Transmission and Spread of Ebolavirus. PLoS Negl Trop Dis [Internet]. 2015 Dec 3 [cited 2016 Mar 21];9(12). Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4669147/
23. Lindblade KA, Kateh F, Nagbe TK, Neatherlin JC, Pillai SK, Attfield KR, et al. Decreased Ebola Transmission after Rapid Response to Outbreaks in Remote Areas, Liberia, 2014. Emerg Infect Dis. 2015 Oct;21(10):1800–7.
24. Agusto FB, Teboh-Ewungkem MI, Gumel AB. Mathematical assessment of the effect of traditional beliefs and customs on the transmission dynamics of the 2014 Ebola outbreaks. BMC Med [Internet]. 2015 Apr 23 [cited 2016 Mar 21];13. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4422472/
25. Walsh MG, Haseeb M. The landscape configuration of zoonotic transmission of Ebola virus disease in West and Central Africa: interaction between population density and vegetation cover. PeerJ [Internet]. 2015 Jan 20 [cited 2016 Mar 21];3. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4304850/
26. Chughtai AA, Barnes M, Macintyre CR. Persistence of Ebola virus in various body fluids during convalescence: evidence and implications for disease transmission and control. Epidemiol Infect. 2016 Jan 25;1–9.
27. Possible sexual transmission of Ebola virus - Liberia, 2015. - PubMed - NCBI [Internet]. [cited 2016 Mar 21]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25950255
28. Folayan MO, Yakubu A, Haire B, Peterson K. Ebola vaccine development plan: ethics, concerns and proposed measures. BMC Med Ethics

RECOMONDED ARTICLES:



Research Journal of Pharmacy and Technology (RJPT) is an international, peer-reviewed, multidisciplinary journal....

Read more >>> (AboutJournal.aspx)

RNI: CHHENG00387/33/1/2008-TC
DOI: 10.5958/0974-360X

1.3
56th percentile

2021
CiteScore

Powered by Scopus

(https://www.scopus.com/sourceid/21100197160?dgcid=sc_widget_citescore)

(https://www.scimagojr.com/journalsearch.php?q=21100197160&tip=sid&exact=no)

Journal Policies & Information

Scope of Focus (FocusScope.aspx)

Informed Consent (InformedConsent.aspx)

Competing Interests (CompetingInterests.aspx)

Privacy Policy (PrivacyPolicy.aspx)

Advertisement Policy (AdvertisementPolicy.aspx)

Disclaimer (Disclaimer.aspx)

Plagiarism Policy (PlagiarismPolicy.aspx)

Publication Ethics (PublicationEthics.aspx)

Reviewers' Guidelines (ReviewersGuidelines.aspx)

Review Policy (ReviewPolicy.aspx)

Correction and Retraction Policy (CorrectionRetractionPolicy.aspx)

QUICK LINKS

- SUBMIT ARTICLE (SUBMITARTICLE.ASPX)
- AUTHOR'S GUIDELINES (DOWNLOADS/INSTRUCTIONS_TO_AUTHOR.PDF)
- PAPER TEMPLATE (DOWNLOADS/PAPER_TEMPLET.DOC)
- COPYRIGHT FORM (DOWNLOADS/COPYRIGHT TRANSFER FORM.DOCX)
- CERT. OF CONFLICT OF INTREST (DOWNLOADS/CERTIFICATE OF CONFLICT OF INTREST.PDF)
- ₹ PROCESSING CHARGES (CHARGESDETAILS.ASPX)
- INDEXING INFORMATION (INDEXED_IN.ASPX)

LATEST ISSUES

- **SEPTEMBER 2024 (76)** (ISSUES.ASPX?VID=17&IID=9)
- **AUGUST 2024 (87)** (ISSUES.ASPX?VID=17&IID=8)
- **JULY 2024 (85)** (ISSUES.ASPX?VID=17&IID=7)
- **JUNE 2024 (86)** (ISSUES.ASPX?VID=17&IID=6)
- **MAY 2024 (77)** (ISSUES.ASPX?VID=17&IID=5)
- **APRIL 2024 (78)** (ISSUES.ASPX?VID=17&IID=4)
- **MARCH 2024 (77)** (ISSUES.ASPX?VID=17&IID=3)
- **FEBRUARY 2024 (77)** (ISSUES.ASPX?VID=17&IID=2)

POPULAR ARTICLES

(AbstractView.aspx?PID=2020-13-7-74)
Pharmaceutical Incompatibilities: Causes, Types and Major ways of Overcoming in Extemporaneous Medicinal forms
(AbstractView.aspx?PID=2020-13-7-74)

(AbstractView.aspx?PID=2020-13-1-43)
Formulation and Evaluation of Herbal Face Cream
(AbstractView.aspx?PID=2020-13-1-43)

(AbstractView.aspx?PID=2017-10-9-42)
Detection of Food Adulterants in Chilli, Turmeric and Coriander Powders by Physical and Chemical Methods
(AbstractView.aspx?PID=2017-10-9-42)

(AbstractView.aspx?PID=2020-13-4-16)
Formulation and Evaluation of Herbal Lipsticks
(AbstractView.aspx?PID=2020-13-4-16)

(AbstractView.aspx?PID=2017-10-9-19)
Formulation and Evaluation of Aspirin Tablets by Using Different Lubricants in Combination for better Kinetic Drug Release Study by PCP
(AbstractView.aspx?PID=2017-10-9-19)

(AbstractView.aspx?PID=2020-13-3-81)
Regulatory requirements for conducting Clinical Trials in India
(AbstractView.aspx?PID=2020-13-3-81)

(AbstractView.aspx?PID=2016-9-11-11)
Sex determination using the mastoid process using South Indian skulls
(AbstractView.aspx?PID=2016-9-11-11)

(AbstractView.aspx?PID=2019-12-11-80)
Dental Waxes–A Review
(AbstractView.aspx?PID=2019-12-11-80)

(AbstractView.aspx?PID=2013-6-2-15)
Medicinal Plants from Solanaceae Family
(AbstractView.aspx?PID=2013-6-2-15)

(AbstractView.aspx?PID=2014-7-9-14)
The Use of Neem in Oral Health
(AbstractView.aspx?PID=2014-7-9-14)

(AbstractView.aspx?PID=2019-12-1-69)
Recent Advances in Preventive Resin Restoration (PRR)
(AbstractView.aspx?PID=2019-12-1-69)

(AbstractView.aspx?PID=2011-4-9-2)
Formulation and Evaluation of Diclofenac gel
(AbstractView.aspx?PID=2011-4-9-2)

(AbstractView.aspx?PID=2010-3-3-60)
Evaluation of Ayurvedic Marketed Formulations Asava's and Arista's.
(AbstractView.aspx?PID=2010-3-3-60)

(AbstractView.aspx?PID=2017-10-12-61)
Mathematical Models in Drug Discovery, Development and Treatment of Various Diseases – A Case Study
(AbstractView.aspx?PID=2017-10-12-61)

(AbstractView.aspx?PID=2018-11-2-70)
Recent Advancements in Laminates and Veneers in Dentistry
(AbstractView.aspx?PID=2018-11-2-70)

Recent Articles

Tags

Not Available

ABOUT JOURNAL

Research Journal of Pharmacy and Technology (RJPT) is an international, peer-reviewed, multidisciplinary journal, devoted to pharmaceutical sciences. The aim of RJPT is to increase the impact of pharmaceutical research both in academia and industry, with strong emphasis on quality and originality. RJPT publishes Original Research Articles,

Short Communications, Review Articles in all areas of pharmaceutical sciences from the discovery of a drug up to clinical evaluation. Topics covered are: Pharmaceutics and Pharmacokinetics; Pharmaceutical chemistry including medicinal and analytical chemistry; Pharmacognosy including herbal products standardization and Phytochemistry; Pharmacology: Allied sciences including drug regulatory affairs, Pharmaceutical Marketing, Pharmaceutical Microbiology, Pharmaceutical biochemistry, Pharmaceutical Education and Hospital Pharmacy.

Read More ››› (AboutJournal.aspx)

VISITORS

Today:

Yesterday:

Total: