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## NEEDS OF EDUCATION ABOUT INFECTIOUS DISEASE WITH SPECIAL REFERENCE TO RESPIRATORY TRACT INFECTION (RTI) AND COVID 19

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**ABSTRACT:** The present study reveals the importance of inclusion of knowledge regarding infectious diseases and their effect on the respiratory system in the school education system and in pharmacy courses. An integrative review of diseases that affect respiratory tract along with COVID 19. Family plays an important role to give protection from any kind of infectious diseases based on the achieved knowledge. Thus the education of consciousness in each and every family about the infectious diseases is very important, particularly mother and head of the family must be well equipped with the knowledge of infectious diseases including RTI *etc.* and then the only large population can fight against COVID 19 like pandemic with minimum mortality and fit society with the good financial system. To restructure the syllabus content in the school education system so that in each and every age, students are compulsory to be knocked about the infectious diseases.

**INTRODUCTION:** The word “Pandemic” originates from the Greek words “pan” meaning all and “demos” meaning “the people, and the word is commonly taken to refer to a widespread epidemic of contagious disease throughout the whole of a country or one or more continents at the same time <sup>1</sup>. The internationally accepted definition of a pandemic as it appears in the Dictionary of Epidemiology is clear-cut and illustrious “an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people. There have been a number of significant infectious pandemics recorded in human history. Including smallpox, cholera, plague, dengue, AIDS, influenza, severe acute respiratory syndrome (SARS), West Nile disease, and tuberculosis.

Influenza pandemics are unpredictable but recurring events that can have severe consequences on societies worldwide <sup>2</sup>. Influenza pandemics have struck about three times every century since the 1500s, or roughly every 10-50 years. In the 20<sup>th</sup> century, there were 3 influenza pandemics which were named “Spanish flu” in 1918-1919, “Asian flu” in 1957-1958, and “Hong Kong flu” in 1968-1969. Each pandemic harmed human life and economic development; *e.g.*, the influenza pandemic of 1918-1919, which killed more than 20 million people in the world and has been cited as the most devastating epidemic in recorded world history <sup>3</sup>.

Recent years have seen at least six large-scale outbreaks-Hantavirus pulmonary syndromes, severe acute respiratory syndrome, H5N1 influenza, H1N1 influenza, Middle East respiratory syndrome, and Ebola virus disease epidemic <sup>4</sup>. In 2002 severe acute respiratory syndrome (SARS) epidemic caused 800 deaths out of about 8 000 cases, the 2009 H1N1 pandemic with 18500 deaths, the 2012 Middle East respiratory syndrome

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(MERS) epidemic that caused 800 deaths out of 2500 cases, the 2014 Ebola outbreak with 28616 cases and 11310 deaths and the current coronavirus disease (COVID-19) pandemic with more than 751154 deaths out of over 20730456 confirmed cases till 14 August 2020<sup>5</sup>.

Emerging infectious diseases continue to infect and reduce human populations. The COVID-19 pandemic had spread to more than 216 countries before it was officially declared as a pandemic by the WHO on the 11<sup>th</sup> March 2020<sup>6</sup>.

SARS-CoV-2 (COVID-19) virus primarily affects the respiratory system, although other organ systems are also involved. Lower respiratory tract infection-related symptoms, including fever, dry cough, and dyspnea were reported in the initial case series from Wuhan, China<sup>7</sup>. In addition, headache, dizziness, generalized weakness, vomiting, and diarrhea were observed<sup>8</sup>. It can be transmitted from human to human by respiratory droplets from sneezing, coughing and aerosols, with symptomatic people being the major source of transmission<sup>9</sup>.

Infectious diseases know no physical barriers or geographical boundaries and can be spread very quickly. Gradually this led to understanding the need to prevent and control the spread of them<sup>10</sup>. Nowadays, health and healthy behavior education are known as the best principles of disease prevention in all communities.

The World Health Organization mentioned that some of the most important strategies of prevention programs are educational institutions and informing the public and believes that enabling people to function actively in a crisis is the important WHO capability<sup>11</sup>. Times have changed and so have school health programs.

Many adults remember school health as consisting of lessons about first aid and the four food groups, with occasional visits to the school nurse for minor illnesses or injuries. While these issues have not disappeared, today's school health programs also are faced with a new array of difficult and seemingly intractable problems: the "new social morbidities" violence, drug, and alcohol abuse, acquired immune deficiency syndrome (AIDS) and other sexually transmitted diseases (STDs), teen pregnancy and depression; students' lack of access

to reliable health information and health care; changing family structures and increasing poverty. A new concept of school health programming the "comprehensive school health program" was proposed in the 1980s as a means to address many of these health-related problems of our nation's children and young people<sup>12</sup>.

Therefore, entry of infectious diseases and particularly RTI (Respiratory Tract Infection) including COVID-19 in the content of educational system in the level of school education is time demand for better health care and to protect world from pandemics. In this present compilation, the importance of inclusion of such knowledge in school education system and in pharmacy courses is discussed.

#### **METHODS:**

##### **Infectious Diseases in School Education System:**

Basically Children and parents are the active members of a family. Education in a family is very important for consciousness.

Prevention of diseases is more important than approaching to cure diseases after their occurrences. The concept of prevention of diseases, particularly from infectious diseases, grows through education and from earned knowledge by the people.

Infection, causes of infection, protection from infection, process to inhibit infection, remedy from infection are not a part of general knowledge, for which they need extra attention.

Therefore it is required to focus on the educational approach from childhood that a child learns. On consideration of NCERT based books of different classes, an observatory table may be furnished.

In the higher studies (MBBS, BAMS, BHMS, BUMS, BPT, B. Pharm, and other medical or paramedical courses infectious diseases are described in detail. But few percentages are fortunate to learn about infectious diseases, including RTI, *etc.*, through these professional courses. Further, in this context, to know about the RTI, *i.e.*, the infectious diseases affecting the respiratory system, a discussion is necessary to reflect the importance of inclusion in the school education system.

**TABLE 1: INFECTIOUS DISEASES INCLUDED IN DIFFERENT CLASSES**

S. no.	Class	Subject searched	Content Containing related to infection	Mentioning of infectious disease	Mentioning of RTI	Mentioning of practices to inhibit/protect RTI
1	5	Science	Nil	Nil	Nil	Nil
2	6	Science	In chapter healthy Body, detail of communicable and non-communicable diseases is given.	Infectious or communicable diseases are given in tabular form under the headings Diseases, Mode of transmission, symptoms and preventive measures.	Common cold and Influenza	Cover mouth and nose while sneezing or coughing. Avoid sitting near a patient. Avoid contact with people who are sick. BCG vaccination.
3	7	Science	Nil	Nil	Tuberculosis NIL	NIL
3	8	Science (Biology)	In chapter Microorganisms, friend and foe, Disease causing microorganisms are given.	In tabular form causative organisms with associated diseases are given.  In other book medium for spread of disease, processes of spread of the disease and name of diseases that can be spread, such content are written in table format. Causative agent, types, Symptoms, prevention and control of Hepatitis, Rabies, AIDS, Polio, Tuberculosis, Cholera, Typhoid, Diarrhoea, Salmonellosis and Anthrax	Pneumonia, Tuberculosis, Pertussis or Whooping cough, Anthrax etc.  Influenza, Common cold	NIL
4	9	Science (Biology)	Details of infectious diseases	Causative agent, types, Symptoms, prevention and control of Hepatitis, Rabies, AIDS, Polio, Tuberculosis, Cholera, Typhoid, Diarrhoea, Salmonellosis and Anthrax	Tuberculosis	Isolation and proper rehabilitation of patient. Avoidance of overcrowding. Better nutritional help to reduce the incidence of disease. BCG vaccination Drug treatment like Rifampicin Isoniazide Streptomycin Pyrazinamide Ethambutol Thioacetazone
5	10	Science (Biology)	NIL	NIL	NIL	NIL
6	11	Science (Biology)	NIL	NIL	NIL	NIL
7	12	Science (Biology)	Chapter human Health and Disease	Under heading Common diseases in humans pneumonia and common cold name is given	Bacteria cause pneumonia affect lungs including symptoms fever, chills, cough & headache. Viruses causing common cold which affects nose and respiratory passage not the lungs.	NIL

### Effect of Infectious Diseases on Respiratory System:

The respiratory system is divided into the upper and lower respiratory tracts. The upper respiratory tract (URT) is composed of the nose, sinus cavities, pharynx (throat), and larynx, while the lower respiratory tract (LRT) is composed of the trachea, and the bronchi and bronchioles within the lungs<sup>13</sup>. Attached to the bronchioles are the alveoli where gas exchange occurs. The URT can contain a variety of resident microbes and potential pathogens, including *Streptococcus pneumoniae*, *Haemophilus* Influenza, and *Staphylococcus aureus*. Therefore the URT plays a critical role in defending against and filtering out foreign material, such as bacterial cells, viruses, dust particles carrying these microbes, and other foreign particles.

In particular, the airway epithelium lining the URT surfaces is involved in a defensive process called mucociliary clearance. Mucus, consisting of glycol proteins secreted from the goblet cells in the airway epithelium, traps microbes and particulate matter, which are then moved by ciliated epithelial cells toward the pharynx, where they are cleared through swallowing or expect rating. In addition, antimicrobial substances, including interferon and several human defensins, along with immune defensive cells (macrophages), help protect the URT from infection. In the LRT, the epithelial cells lining the alveolar and respiratory bronchioles are not ciliated. However, the region is covered by alveolar fluid, which contains a number of antimicrobial components, including immune globulins. If excessive numbers of microbes enter the alveoli, the alveolar macrophages recruit neutrophils from the pulmonary capillaries to help clear the invaders<sup>14</sup>.

### Several Bacterial and Viral Diseases Affect the Upper Respiratory Tract:

**Pharyngitis:** A sore throat, known medically as pharyngitis, is an inflammation of the pharynx and sometimes the tonsils (tonsillitis)<sup>15</sup>. *Streptococcus pyogenes* group A *Streptococcus* (GAS), is the bacterial etiology of greatest concern in cases of acute pharyngitis because of the association between GAS and acute rheumatic fever<sup>16</sup>. Other respiratory viruses that cause pharyngitis include rhinoviruses, enteroviruses, influenza A and B, parainfluenza viruses, respiratory syncytial virus,

coronaviruses, human metapneumovirus, and human bocavirus<sup>17, 18, 19</sup>. Several human herpesviruses, such as Epstein-Barr virus, herpes simplex virus (HSV) and human cytomegalovirus (CMV) have also been reported to cause pharyngitis, as well as human immune deficiency virus type 1 (HIV-1).

The *S. pyogenes* cells are highly transmissible and reach the URT within respiratory droplets expelled by infected individuals during coughing and sneezing. If the cells grow and secrete toxins, inflammation of the oropharynx and tonsils can occur. Besides a sore throat, fever, headache, swollen lymph nodes and tonsils, and a beefy red appearance to pharyngeal tissues owing to tissue damage may occur. Scarlet fever is a disease arising in about 10% of children with streptococcal pharyngitis or a streptococcal skin infection. Some strains of *S. pyogenes* secrete erythrogenic (erythro = "red") exotoxins that cause a pink-red skin rash on the neck, chest, and soft-skin areas of the arms. A serious complication resulting from a lack of treatment is rheumatic fever. This post infectious sequela involves the body's antibodies to *S. pyogenes* mistakenly cross-reacting with similar proteins on heart muscle and can lead to permanent scarring and distortion of the heart valves, a condition called rheumatic heart disease<sup>14</sup>.

**Diphtheria:** Diphtheria is an acute, communicable disease caused by exotoxin-producing *Corynebacterium diphtheria*. Diphtheria is acquired by inhaling respiratory droplets or by direct contact with the skin from an infected person. Initial symptoms include a sore throat and low-grade fever. On the surface of the mucus membrane of the throat or mouth, the bacterial cells secrete a potent exotoxin capable of inhibiting protein synthesis in surrounding host cells and resulting in cell death.

A prominent feature is the accumulation of dead tissue, mucous, white blood cells, and fibrous material called a pseudomembrane (pseudo because it does not fit the definition of a true membrane) on the tonsils or pharynx  $\times 20$ . Mild cases fade after a week, while more severe cases can persist for 2 to 6 weeks. Complications can arise if the thickened pseudomembrane results in respiratory blockage, making breathing extremely difficult.

Left untreated 5% to 10% of respiratory cases result in death. If the exotoxin spreads to the bloodstream, heart and peripheral nerve destruction can lead to cardiac arrhythmia and coma<sup>14</sup>.

**Sinusitis:** Sinusitis is generally triggered by a viral upper respiratory tract infection, with only 2% of cases being complicated by bacterial sinusitis<sup>21</sup>. The European Academy of Allergology and Clinical Immunology defines acute rhinosinusitis as, "Inflammation of the nose and the paranasal sinuses characterized by two or more of the following symptoms: blockage/congestion; discharge (anterior or postnasal drip); facial pain/pressure; reduction or loss of smell, lasting less than 12 weeks." Additional symptoms such as toothache, pain on stooping and fever or malaise<sup>22</sup>.

**Pertussis:** Pertussis (whooping cough) is caused by *Bordetella pertussis*, an acute respiratory infection marked by severe, spasmodic coughing episodes during the paroxysmal phase. The *bordetellae* are small, Gram-negative, aerobic *coccobacilli*<sup>23</sup>. The bacilli are spread by respiratory droplets that adhere to and aggregate on the epithelial cells in the mouth and throat. Exotoxin production paralyzes the ciliated cells and impairs mucus movement, potentially causing pneumonia<sup>14</sup>.

**Influenza:** Influenza (mostly referred to as "flu") is a contagious viral infection caused primarily by the influenza virus A or B. It affects mainly the upper respiratory organs (*i.e.*, the nose, throat, bronchi, and infrequently, lungs), but other organs such as the heart, brain, and muscles can be involved. Influenza viruses belong to the family of viruses termed "Orthomyxoviridae", an RNA-type virus with diverse antigenic characteristics. They are divided into 3 main types: A, B and C. Most of the epidemics and outbreaks of flu are caused by types A and B, with type C being generally responsible for sporadic mild upper respiratory symptoms<sup>24</sup>. Influenza typically begins with the abrupt onset of symptoms following an incubation period of 1 to 2 days. Primarily, these symptoms are systemic and consist of fever sensation, true chills, headache, severe myalgia, malaise, and anorexia. Mostly headache, myalgia, and fever determine the severity of the disease insofar as they are more prominent<sup>25</sup>. Most of the annual deaths from seasonal influenza are due to secondary bacterial

pneumonia. In fact, it appears a flu infection can trigger *S. pneumoniae* to disperse from the biofilms in the nose or throat and colonize the lung, leading to bacterial pneumonia<sup>14</sup>.

**Tuberculosis (TB):** Tuberculosis (TB) is an infectious disease caused by the bacillus *Mycobacterium tuberculosis* (Mtb). It is the most dangerous bacterial infection responsible for a severe increase in death cases<sup>26</sup>. Tuberculosis is a chronic granulomatous infectious disease. Infection occurs via aerosol and inhalation of a few droplets containing *M. tuberculosis* bacilli. After infection, *M. tuberculosis* pathogenesis occurs in two stages. The first stage is an asymptomatic state that can persist for many years in the host, called latent TB<sup>27</sup>. *Mycobacterium tuberculosis* bacilli, inhaled as airborne droplets or dried sputum, are carried to the lung alveolar space. The bacilli are phagocytosed by resident alveolar macrophages as more monocytes are attracted to the site. As macrophages become infected and cannot clear the infection, some uninfected macrophages in the developing granuloma (tubercle) differentiate into multinucleate cells and foamy (lipid-containing) cells. Eventually, T and B lymphocytes organize around the periphery of the granuloma as fibrous collagen sheath walls off the infection. Many of the granulomas remain in this steady state of latency for years or a lifetime. However, reactivation to secondary active disease brings about loss of the structured state in the granuloma, and eventually, infectious bacilli are freed into the alveolar airways and into the lung. Coughing can now spread the bacilli to other individuals<sup>14</sup>.

**Anthrax:** Anthrax is an acute bacterial zoonosis of mainly wild and domestic herbivores (*e.g.*, cattle, sheep, goats, donkeys, horses, reindeer, antelopes, and camels), although any warm-blooded animal might circumstantially get infected. It is caused by *Bacillus anthracis* and is occasionally transmitted to humans<sup>28</sup>. Anthrax in humans can result from occupational agricultural or industrial exposure and non-occupational (accidental or everyday) exposure<sup>28, 29</sup>. Animal graves and burial sites, bio thermal pits, and other places for the disposal of animals that died of anthrax are referred to as anthrax (soil) foci, anthrax districts, or permanent anthrax foci<sup>28</sup>. It initially resembles a common cold (fever, chills, cough, chest pain, headache, and malaise). After

several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is usually fatal without early antibiotic treatment<sup>14</sup>.

**DISCUSSION:** Research on medicines is going on, and this continuous process will never be ended. New medicines for old diseases are coming up in every year. But for a new type of disease, it is becoming too tough to get immediate relief by using appropriate drugs. It is also observed that new medicines for new diseases are not coming up very easily and immediately. Thus as when a new disease arrives in the world, people are getting scared, and ultimately, many lives are destroyed. COVID-19 teaches us that knowledge of consciousness is more important than research to prevent a pandemic.

Going through the courses in a school education system that one can easily say that the courses till to reach eighteen years of age is not sufficient to fight against infectious diseases and to protect self from RTI and obviously from COVID-19. A touch to protect self is mentioned in brief in the course content of class six and nine; otherwise, no where it is knocked. Causes of infectious disease are somehow described in the content to be taught at every age. Particularly the respiratory tract infection is not stressed. Medical and paramedical courses, including pharmacy, are well equipped with the knowledge of infectious diseases and RTI, including remedy. But in the ocean of large population, it is like a drop of water. Previously it is mentioned that the family plays an important role in giving protection from any kind of infectious diseases based on the achieved knowledge.

**CONCLUSION:** The education of consciousness in each and every family about the infectious diseases is very important, particularly mother and head of the family must be well equipped with the knowledge of infectious diseases including RTI *etc.* and then the only large population can fight against Covid-19 like pandemic with minimum death and healthy society with the wealthy economy. Therefore it is required now only to restructure the syllabus content in the school education system so that in each and every age, students are compulsory to be knocked about the infectious diseases including RTI and COVID-19 like pandemic diseases for a healthy world.

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## REFERENCES:

1. Honigsbaum M: Historical keyword pandemic. *The Lancet* 2009; 373: 1939.
2. Qiu W, Rutherford S, Mao A and Chu C: The pandemic and its impacts. *Health Cult and Society* 2016; 9-10: 1-11.
3. WHO: Global burden disease. [http://www.who.int/healthinfo/global\\_burden\\_disease/](http://www.who.int/healthinfo/global_burden_disease/) Global Health Risks\_report b -Accessed on 2011; 22: 2013.
4. Gostin LO, Tomori O, Wibulpolprasert S, Jha AK, Frenk J, Moon S, Phumaphi J, Piot P, Stocking B, Dzau VJ and Leung GM: Toward a common secure future: four global commissions in the wake of ebola. *PLOS Medicine* 2016; 13(5): 1-15.
5. WHO: Coronavirus disease (COVID-19) pandemic. [https://www.who.int/emergencies/diseases/novel\\_coronavirus\\_2019](https://www.who.int/emergencies/diseases/novel_coronavirus_2019); 30: 2020.
6. Anjorin AA: The corona virus disease (COVID-19) pandemic a review and an update on cases in africa. *Asian Pacific Journal of Tropical Medicine* 2020; 13(5): 199-03.
7. Huang C, Wang Y, Ren X, Li L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z, Yu T, XiaWei J, Wu YW, Xie X, Yin W, Li H, Liu M, Xiao Y, Gao H, Guo L., Xie J, Wang G, Jiang R, Gao Z, Jin Q, Wang J and Cao B: Clinical features of patients infected with novel corona virus in Wuhan China. *Lancet* 2020; 395: 497-06.
8. Shi H, Han X, Jiang N, Cao Y, Alwalid O, Gu J, Fan Y and Zheng C: Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study. *Lancet Infectious Diseases* 2020; 20: 425-434.
9. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong YM, Ren R, Kathy M, Leung SM, Lau EHY, Wong JY, Xing X, Xiang N, Wu Y, Li C, Chen Q, Li D, Liu T, Zhao J, Liu M, Tu W, Chen C, Jin L, Yang R, Wang Q, Zhou S, Wang R, Liu H, Luo Y, Liu Y, Shao G, Li H, Tao Z, Yang Y, Deng Z, Liu B, Ma Z, Zhang Y, Shi G, Lam TTY, Wu JT, Gao GF, Cowling BJ, Yang B, Leung GM and Feng Z: Early transmission dynamics in wuhan, china, of novel coronavirus-infected pneumonia. *The New England Journal of Medicine* 2020; 382: 1199-07.
10. Hatami H, Razavi SM, Eftekhari A, Majlesi F, Nozadi MS and Parizade SMJ: *Textbook of public health* Tehran. CA Arjmand Publications Ed 1<sup>st</sup> 2004.
11. Glanz K, Rimer BK and Viswanath K: *Health behavior and health education*. Heory Research and Practice CA 2008.
12. Allensworth D, Lawson E, Nicholson L and Wythe J: *Schools and health our nation's investment*. The National Academies Press 1997.
13. Tu J, Inthavon K and Ahmadi G: *Computational fluid and particle dynamics in the human respiratory system* 19. *Biological and Medical Physics Biomedical Engineering* 2013.
14. Pommerville JC: *Fundamentals of microbiology: body systems*. Jones & Bartlett Learning Publication Ed 3<sup>rd</sup> 2016.
15. Alcaide ML and Bisno AL: *Pharyngitis and epiglottitis*. *Infectious Disease Clinics of North America* 2007; 21: 449-69.
16. Komaroff AL, Pass TM, Aronson MD, Ervin CT, Cretin S, Winickoff RN and Branch JRWT: *The prediction of*

- streptococcal pharyngitis in adults. *Journal of General Internal Medicine* 1986; 1: 1-7.
17. Bastien N, Robinson JL, Tse A, Bonita E, Lee L and Li Y: Human coronavirus NL-63 infections in children: a 1-year study. *J of Clinical Microbiology* 2005; 43: 4567-73.
  18. Huovinen P, Lahtonen R, Ziegler T, Meurman O, Hakkarainen K, Miettinen A, Arstila P, Eskola J and Saikku P: Pharyngitis in adults the presence and coexistence of viruses and bacterial organisms. *Annals of Internal Medicine* 1989; 110: 612-16
  19. Esposito S, Blasi F, Bosis S, Droghetti R, Faelli N, Lastrico A and Principi N: Aetiology of acute pharyngitis: the role of atypical bacteria. *Journal of Medical Microbiology* 2004; 53: 645-51
  20. Hadfield TL, McEvoy P, Polotsky Y, Tzinslering VA and Yakovlev AA: The pathology of diphtheria. *The Journal of Infectious Diseases* 2000; 181: 116-20.
  21. Lau J, Zucker D, Engels EA, Balk E, Barza M, Terrin N, Devine D, Chew P, Lang T and Liu D: Diagnosis and treatment of acute bacterial rhinosinusitis. *Evidence Report Technology Assessment Summary* 1999; 9: 1-5.
  22. Ah-See KW and Evans AS: Sinusitis and its management. *British Medical Journal* 2007; 334(7589): 358-61.
  23. Finger H, Heinz C and Von Koenig W: In medical microbiology. Galveston Edi 4<sup>th</sup> 1996; 31.
  24. Moghadami M: A narrative review of influenza a seasonal and pandemic disease. *Iranian Journal of Medical Sciences* 2017; 42(1): 2-13.
  25. Weinstock DM, Gubareva LV and Zuccotti G: Prolonged shedding of multidrug-resistant influenza A virus in an immune compromised patient. *New England Journal of Medicine* 2003; 348(9): 867-8.
  26. Sharma D and Sarkar D: Pathophysiology of tuberculosis: an update review. *Pharma Tutor* 2018; 6(2): 15-21.
  27. Stefan Kaufman: Introduction. *Seminar in Immunology* 2014; 26(6): 429-30.
  28. Finke EJ, Beyer W, Loderstädt U and Frickmann H: The risk of contracting anthrax from spore-contaminated soil - a military medical perspective. *European Journal of Microbiology and Immunology* 2020; 10(2): 29-63.
  29. Lukhnova LY, Izbanova UA, Meka-Mechenko TV, Nekrasova LE, Atshabar BB, Kazakov VS, Sushchikh VY and Ospanova GM: Anthrax prevention in Kazakhstan. *Journal of Medicine* 2017; 147: 175-79.

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