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Tuberculosis: Notifiable Disease in India

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Abstract

Tuberculosis accounts for nearly one third of world's population and is declared as the most widespread infectious disease prevalent in India than HIV/AIDS. According to a survey conducted, the World Health Organisation (WHO) global TB report has stated India as the country with the highest number of TB cases reported in 2014 with an estimation of 2.2 million cases. The reason being TB highly prevalent in India is the country's large population, lack of proper nutrition, compromised immune system and ignorance. Many reforms and policies are being undertaken by the government as well as the private sector health care providers to make India a TB free country. However the poorly unmonitored and unregulated private sector health care providers who are responsible for diagnosing and keeping records for half of the TB cases in India fail to report the accurate TB incidence. Ignorance and fear factor among the people has let the disease dominate the whole nation. In May 2012, centre declared TB as the notifiable disease with an immediate effect with an aim to bring about a positive change and improvement in collecting patient care information. It's high time to make India a TB free country and together we can achieve it.

Keywords: Pulmonary tuberculosis; Mycobacterium tuberculosis; Malnutrition; Ignorance; Population; Anti resistant drugs; Notifiable disease

Introduction

TB is caused by which is an obligate pathogenic bacterium. The mycolic acid coating on its surface makes the cells impenetrable to gram staining and make the bacterium either gram positive or gram negative [1-10]. TB is air borne and spreads through the sputum of an infected person through sneezing, coughing, spitting etc. TB generally affects the lungs and is known as pulmonary tuberculosis with symptoms like chest pain and coughing blood through sputum. TB can spread to other parts of the body and is known as extra pulmonary TB with symptoms like weight loss, night sweats, chills, appetite loss and fever [10-15].Asymptomatic TB is called latent tuberculosis but if left untreated cost lives. This disease is highly prevalent within smokers, malnourished people, people with compromised immune system, people diagnosed with HIV/AIDS infection, diabetes mellitus and overcrowded population. Social stigma attached with the disease and ignorance has possessed a greater threat for large number of deaths. The main objective behind the eradication should be proper disease diagnosis, treatment in right time and awareness [15-27].A number of TB awareness programme has been effective in decreasing the stigma whereas a lot of effort has to be made in this direction. People can be made aware through awareness programmes, proper education, preventive measures, internet sites and health providers. There are many open access

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journals that increase the visibility and accessibility to the masses. These peer reviewed journals are provided with particular impact factor to ensure excellence, essence of the work and number of citations received for the same published articles. It is mainly calculated based on the number of articles that undergo a double blind peer review process by the Editorial Board [27-38].

Tuberculosis: a challenge

However, there are various societies that work for the well-being of the masses by educating them with precautionary measures with an aim to eradicate ignorance and the stigma attached with the disease [38-40]. European-Society-of-Clinical-Microbiology-&-Infectious-Disease , one of the leading societies in clinical microbiology and infectious diseases had collaborated with OMICS International to educate the masses about the emergence of deadly infectious diseases and to inspire the masses to be educated with the preventive measures and the social stigma attached to the diseases[40-55]. European Society of Pharmacogenomics and Theranostics mainly focus on the improvement of medicine delivery to the affected persons at the right time with proper doses. It also encourages team work and network establishment to facilitate the transformation of basic research into clinical benefit. European Association of Hospital Pharmacists represents pharmacists at international and European levels [55-67]. It develops hospital pharmacy profession within Europe aiming the continuous improvement of patients in the hospitals. It is achieved through proper education, research, scientific approaches and best health care practise with other health care professionals. Pharmaphorum media limited believes in change that can be brought by exchanging innovative ideas by connecting with people [67-78]. It has achieved success through open access publications, advertisements in media as well as the services they provide. The main objective is to connect healthcare professionals to support pharma in creating innovations. The main objective of these societies is to "exchange and deliver innovative ideas for the betterment of the society" [78-90].

Open access journals play a major role in creating awareness among the masses. They increase the visibility and accessibility without financial or legal barriers. Journal of Lung Diseases & Treatment publishes all peer reviewed articles covering lung diseases, diagnosis and treatment. It aims in targeted drug delivery for lung diseases and also showcases new developed techniques and therapeutics for diagnosing and treating lung diseases.[90-110].Journal of Infectious Diseases & Preventive Medicine aims in publishing articles about remerging diseases that provides any information about the ancient diseases to take precautionary steps in combating any re-emergence of diseases in near future. Mycobacterial Diseases aims in publishing peer reviewed articles on infections mainly caused by the mycobacterium species followed by the strategies undertaken to curb the disease and the efficient treatment possible to overcome the disease [110-130]. Journal of Pulmonary & Respiratory Medicine aims in providing knowledge about the diseases affecting lungs and the respiratory tract and the possible treatment followed for curbing the disease. This journal published one article citing the effectiveness of moxifloxacin prophylaxis in HIV patients having contact history of multidrug resistant tuberculosis (MDR-TB). It rendered a conclusion that six months of moxifloxacin decreased the incidence of tuberculosis as well as the mortality. Clinical Microbiology: Open Access provides article rendering special clinical attention to the diseases caused by the microorganisms and the possible treatment required in diagnosing and treating the disease. It however educates the readers that the diseases caused by the microbes needs special clinical attention as they go hand in hand. An article entitled "Current Overview of Anti-Tuberculosis Drugs: Metabolism and Toxicities" explains the mechanism associated with the first line and second line anti tuberculosis drugs and the toxicity associated with the second line drugs. Hepatotoxicity resulted as the major side effect outcome for almost all first line anti tuberculosis drugs except Ethambutol [130-165]. Tuberculosis is most fatal in HIV

patients which lead to their death. These peer reviewed open access journals plays a major role in inspiring and motivating the readers about the facts and myths related to a particular disease.

Apart from these open access journals many conferences are being held worldwide to educate and motivate the masses. 4th International Congress on Bacteriology and Infectious Diseases held at San Antonio, Texas in May, 2016 focused on the infectious diseases caused by the pathogenic bacteria and the need of proper treatment and medication. It provided a global platform to provide new insights in the field of microbiological emerging infections and the precautionary measures and treatment needed to combat the diseases [165-170]. 3rd International Conference on Chronic Obstructive Pulmonary Disease held in July 2016, in Brisbane, Australia represented serious lung health ailments that required new emerging modern diagnosis and treatment. It helped in exchanging novel ideas and techniques among the scientists, health care professionals and students with an aim to meet the requirements like the unmet treatment for patients improving the patient outcomes. The 3rd Euro-Global Conference on Infectious Diseases was held in September in Frankfurt, Germany with an aim to curb the infectious diseases through proper diagnosis, right time treatment and efficient vaccine development in response to the innumerable deaths caused worldwide. 2nd International Congress on Bacteriology and Infectious Diseases also focused on exchanging ideas with a motive to bring about change in pathogenesis, disease diagnosis, treatment and creating awareness [170-180].

Resistance to drugs: upcoming research by researchers

Tuberculosis has become a life threatening infectious disease accounting one third of world's population. Many conferences are held worldwide with an aim to control the disease pathogenesis and it's widespread. Many notable speakers have given their valuable suggestions on this widespread disease mainly prevalent in low income and developing countries with overcrowded population. Ajay K Saxena, a renowned professor from Jawaharlal Nehru University having a research interest in structure biology in disease related proteins and vaccine development gave his views about the structural and functional analysis of key proteins involved in ESX-1 protein secretion system of M. Tuberculosis which can prove to be the novel targets for drug developments. Another notable investigator Alexander Pym at African Health Research Institute, have numerous publications on recombinant TB vaccines, Esx secretion systems and population genetics of mycobacterium. He is mainly focused on understanding the biological basis of resistance and persistence in *M. tuberculosis* and defining biomarkers for treatment response. However in his research he found new mutations associated with drug resistance [180-185].

An article entitled "Changing Trends in the Susceptibility Pattern of Mycobacterium tuberculosis Over a Decade from a Tertiary Care DOTS Centre Delhi" published in Mycobacterial Diseases journal by Kaveeta Gupta mentioned the alarming growing resistance of the bacterium towards the drug streptomycin in both pulmonary and extra pulmonary isolates. It has produced an alarming state where the significant increase in drug resistance has resulted in high mortality rates. This situation demands stricter TB programmes along with proper data management and proper second line medications with immediate hospitalisation before the condition worsens. Anil Ojha of University of Pittsburgh, USA studies the mechanism by which the spontaneous nature of mycobacterium species becomes resistant to drugs and other stresses. Dr. Alastair Miller of Royal Liverpool University Hospital, UK has interest in HIV/AIDS and tuberculosis. Horacio Bach of Canada works on signal transduction with interest in mycobacterium virulence factors and resistance to drugs [185-200].

Conclusion

Tuberculosis has emerged as one of the lethal diseases and has raised an alarming situation. Asymptomatic TB also called as latent tuberculosis can be dangerous if left untreated**.** Diagnosing TB mainly depends on chest X-rays, sputum examination through microscopic techniques as well as body fluid microbial culture where as latent tuberculosis mainly depend on tuberculin blood test or skin test. However this treatable disease has become a major concern as there are no well-maintained records of the patients. Many people infected with TB are not even present in the record to be diagnosed and treated. The spontaneous nature of the bacterium helps it to sustain and become drug resistant. The drug resistant TB has become a serious challenge to the health professional as well as for the mankind. India being a developing and largely populated country is struggling with this challenge since ancient times. May 24th is celebrated as world TB day and on May 2012 TB is announced as the notifiable disease by the centre with an immediate effect with a hope and dream to make India a TB free country.

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