



An Overview of Prevalence of Tuberculosis in Suspected Population

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Abstract

Tuberculosis is a specific chronic infection caused by Bacteria Belonging to Mycobacterium tuberculosis. Tuberculosis is declared by world health Organization (WHO) as global disaster. Tuberculosis, is bacterial disease caused by Mycobacterium, it is an infectious tuberculosis, when infected person coughs, sneezes, laughs or even sings. T.B is one of the leading causes of Mortality and Morbidity across all age's groups. Mycobacterium tuberculosis is a frequent obligate human pathogen. Prevalence survey is important to know why the adults infected with mycobacterium tuberculosis. In conclusion, tuberculosis remains a significant public health challenge globally, with a high prevalence in low- and middle-income countries. The burden of tuberculosis is particularly high in impoverished communities where poor living conditions, overcrowding, and malnutrition make people more susceptible to infection.

Keyword: Tuberculosis, Mortality, mycobacterium, malnutrition

Introduction

Tuberculosis is a specific chronic infection caused by Bacteria Belonging to Mycobacterium tuberculosis. It is the main infectious disease in public health. It can affect any organ of the body but in two third of the cases it involves the lungs, Central nervous system parenchyma and circulatory system are mostly effected by this disease. This form of tuberculosis is called Pulmonary tuberculosis, it may be primary or secondary depending upon priorexposure (Mohammad et al., 2010).

Tuberculosis is declared by world health Organization (WHO) as global disaster because of the scale of epidemic and the urgent need to improve global tuberculosis control since then world health organization has promoted the strategy for global tuberculosis control known as DOTS (Directly Observed treatment short Course) and its adaptations it is generally positive in areas where the prevalence of Multidrug resistant tuberculosis is high (Dermot et al.,2005).

New modalities for diagnosis and treatment of T.B is needed as Still millions of people are suffering and dying from this disease. It is one of the top three infectious killing disease which kills 2 million people each year, it's because T.B is commonly asymptomatic disease because the bacterium grows and multiplies in the Macrophages, thus the avoiding Natural defense system in the patient's serum (Gursiment et al.,1993)

In mostly developing countries among the top infectious Bacterial disease. Tb is one of the leading causes health problems with global mortality ranging from 1.6 to 2.2 million lives per year. T.B is a major air born infection among All the ages and over 95% of TB deaths occure and low- and middle-income countries (Iqbal & Bilal, 2021). TB can among the top three causes of death for women aged 15 to 44 years. Tuberculosis is more common in developing countries specially in old age (50) people. Approximately worldwide one- third population is infected with this microbe. (Shams, et al.,2014) The situation is further become problematic due to increasing incidence of drug resistant T.B.but positive step is that new radiometric and Molecular diagnostic techniques have been introduced and widely used now, it is estimated that between 60 % and 70 % of all T.B cases are diagnosed by mean of sputum smear examination (Rohi et al.,2009)

Tuberculosis, is bacterial disease caused by Mycobacterium, it is an infectious tuberculosis, when infected person coughs, sneezes, laughs or even sings. Which is most commonly affects the lungs. It is transmitted due to person to person droplets from the throat and lungs of people with the active respiratory disease.

Tuberculosis is a major public health problem worldwide, with an estimated 9.0 million new cases each year (world health organization,2014). The causative agent of tuberculosis in an acid fast and rod shaped bacillus (World health organization, 2004). T.B is still the leading cause of illness of worldwide which accounted for 25% of global burden of disease. About a 3rd of the world's population is estimated to be infected with tubercle bacilli, and hence at risk of developing active disease (FMH et al.,(2008).

T.B is an infection highly efficacious worldwide. Currently it is considered the most important communicable diseases who propagation reaches across the boundaries of developing countries. The number of T.B cases has also been increasing in developed countries mainly because of immigration between nation as consequences of acquired immunodeficiency syndrome (AIDS), and also because of the utilization of immunosuppressive drugs. To give an idea of the world's population has already had contact with the tubercle bacillus and more than 10 million cases are diagnosed every year (Lawn and Zumla,2011)

T.B is one of the leading causes of Mortality and Morbidity across all age's groups throughout the world, especially in developing countries are also known as associated with poverty, deprivation and immunodeficiency (Ayaz et al., 2012; Bilal, 2021).

The prevalence rate of Tuberculosis is slower than its re-emergence which is a dangerous thing for patient, the causes of re-emergence are many but is most important are poverty, crowding,

homelessness, substance abuse due to the above factors the concept of multi-drug resistance is developing and it becomes the T.B un-treatable disease (although it is usually not very dangerous disease)if treatment is in sequence and on the proper time the patient recovery is an easy task (Rubina et al.,2013)

The natural history of tuberculosis begins with the inhalation of *M. tuberculosis* organisms. Tuberculosis has been present in human since antiquity. whether tuberculosis originated in bovines, then was transferred to human or whether it diverged from a common ancestor, is currently unclear (pearce,et al 2006). Skeletal remain show prehistoric humans (4000 BC) had T.B researcher have found tuberculosis decay in the spines of Egyptian mummies dating from 3000 to 24000 BC. Genetic studies Suggest T.B was present in Americas from about 100AD (Konomi et al.,2002).

Although the pulmonary form is associated with tubercles was established as a pathology by Dr Richerd Morton in 1689, due to variety of its symptoms.it was named “tuberculosis”until 1839, by J.L. Schonlein (carthy,2001).

The bacillus causing tuberculosis *M.tuberculosis* ,was identified and described on 24th March 1882 by Robert Koch,Koch announced a glycerine extract of the tubercle bacilli as a Remedy for tuberculosis in 1890,calling it”tuberculin”(Waddington et al., 2004)

Albert Calmette and CamiileGurein achieved the first genuine success in immunization against tuberculosis in 1906, using attenuated bovine strain tuberculosis.it was called bacilli Calmette-Gurein (BCG). The BCG vaccine was first used on human in 1921 in France (Bonah,et al.,2005).

Mycobacterium tuberculosis is a frequent obligate human pathogen. It is 1-4 micrometer in length, it has a complex life cycle comprises different environments and developmental stages.it success is result from its remarkable capacity to survive within the infected host, where it can it for several decades.it is due to its unusual cell wall however there is less information about the modulation of call wall component when environment is changing for them.it is more resistant and persistent because of several genes expression on the same time. (Cosma et al.,2003).

T.B can be controlled by preventing infection, by stopping progression from infection to active disease, and by treating active disease. Medication is used in the treatment of tuberculosis include both those used primarily for T.B treatment and those with a broad spectrum of Antimicrobial activity, which includes *Mycobacterium tuberculosis* drugs is used primarily in T.B include isoniazid, pyrazinamide, and ethambol which most often is used as 4th the drug in initial regimens (peloqoin et al 2003).

Tuberculosis drugs with other indications include the (rifampin, rifabutin and rifapentin), the aminoglycosides (specifically streptomycin, amikacin, kanamycin, paramomycin), and the fluoroquinolones (ciprofloxacin, ofloxacin, levofloxacin, Moxifloxacin, gatifloxacin) (Rosenthal et al.,2007)

Tuberculosis is poverty infection in worldwide and show a high incidence rate in underdeveloped countries, its propagation is directly linked with socioeconomic and hygienic condition of human population, except for the recent increase in the incidence of tuberculosis in affluent west due to AIDS, it is generally widely occurred in the southeast Asia and greatly afflicted 44% of its population is reported to have Mycobacterium tuberculosis is infected.it occurs in both sexes, in all age group and can affect virtually all organs of the body,besides the anatomical sites involved ,it has a wide spectrum of clinical presentation.it may be pulmonary or Extra-pulmonary Tuberculosis. In the last several years, the number of EPTB is increase in number of world over, proportion of all reported T.B Cases. Extra pulmonary T.B mostly occur in young children and immunosuppressed persons. More than 50% of cases occur with HIV. (Golden et al.,2005; Bilal & Urooj, 2021).

Notable extra pulmonary infection sites includes the pleura (in tuberculosis pleurisy), the central nervous system(in tuberculosis meningitis),The lymphatic system in scrofula of the neck),the genitourinary system(in urogenital tuberculosis),The bones and joints (in pot disease of the spines) among others when it spread to the bones, it is also called osseous tuberculosis, (Kabra et a.,2006).The specimens collected from extra-pulmonary sites chiefly consisting of body fluids, aspirates and biopsies from lymph nodes and other body sites.The lymph nodes aspirates, peritonia; fluid, cerebrospinal fluids and ascetic fluids were examined for extrapulmonary tuberculosis infection (Yohannes et al.,2013).

But the data is limited about situation of EPTB in the developing countries in general and our region in particular but two things are clear for prevalence of EPTB to assess if some of the demographic factors like sex and age could act predisposing factors in the causation in our region and also to find the frequency of biopsy-proved tuberculosis in our various organ system of the body(Shafiullah et al.,2008)

The prevention of T.B is very difficult process due to noncompliance with treatment and Multidrug resistance of its pathogen Mycobacterium tuberculosis a survey report shows that about 80% of the practitioners still prescribe long duration chemotherapy. The most frequently prescribed drugs among the patients of Bajaur survey were rifampicin (87%),isoniazid (89%) and streptomycin (73%) despites

the use of highly effective drugs the duration of illness after diagnosis in 31% is over three year(Mohammad et al.,1994)

During 2009 the T.B ratio in Pakistan was most common on the top list of top health deteriorated disease with ratio of 373 per 100,000.Despite rapid expansion and consolidation of T.B care there are still many issues related to T.B control 75% patients are in productive age groups. Many patients consult untrained practitioners in informal health sectors which delay the diagnosis.Suboptimal cases detection and treatment leads to the failure in achieving program target goals.

World health Organization (WHO) and international union against tuberculosis lung disease (IUATLD) urge the use of DOTS strategy to control T.B.The purpose of DOTS is to ensure patient adherence to treatment regularly up to the end and to prevent resistance to medicines by encouraging them but still the T.B failure is due to the reason that in highly burdened T.B countries, DOTS in the health facility is not always convenient and accessible. In different countries the intervention of different strategies like family membrane, supervision and community workers involvement have shown a lot of improvement in the successful treatment of T.B.So due to the above poor treating process the investment of the world programs of T.B.prevention is becoming unsuccessful in order to improve it we must co-operate to achieve best result from the T.B prevention programs(Raza et al.,2012)

Tuberculosis are slowly progressive and debilitating disease which kill more than 1.5 million people worldwide.it is observed that more male as compared to females are screened and diagnosed with tuberculosis in developing and developed world and female ratio 1.96+0.6 has reported around the world. This gender discrepancy is so pronounced that the male gender was reported a risk factor for tuberculosis by this information. A number of biological, social, cultural and economic factor are implicated for this gender bias, among which socio-cultural factors have been reported to play a central role in the delays in diagnosis and treatment of tuberculosis in female population.In different countries, a number of factors causing delay in diagnosis and treatment of male and female patients have been identified, which include cultural restriction to the access of health care,health belief system,treatment from non-professional health care,health belief system,treatment from non-professional health care providers, fear of stigmatization and self-medication.some reports also shows that occasionally doctors can also be responsible for the delay in diagnosis as they tend to ignore the symptoms of female, which results in late diagnosis and treatment.

It was also reported that the female population patients of child bearing age are less likely to seek early medical attention, despite evidence that the disease is reported to progress more rapidly in these

patients. Some research may indicate clearly that biological factors may also be act as contributors to gender discrepancy in T.B due to differences in hormonal and Psychological profiles between the two sexes. The possibility that differential Male and female ratio might not be due to health in equalities only cannot be over looked (yahyaet al.,2015).

Pulmonary Tuberculosis is an infectious disease with air born transmission that caused by mycobacterium tuberculosis is associated with Morbidity and Mortality worldwide. Although pulmonary tuberculosis is the most common presentation of this disease. (Yohannes et al.,2013) The main symptoms of pulmonary tuberculosis is loughing, hemoptysis,chest pain and dyspnea. prolonged cough producing sputum. The Excessive and its prevalence and economic status are related to the investigation of pulmonary tuberculosis (Bilal, 2021). About 25% of people are asymptomatic. Systematic manifestation of the disease includes fever, malaise, anorexia, weight loss, weakness and night sweats. pulmonary tuberculosis varies among countries and Its prevalenceand economic status are related to the investigation of pulmonary tuberculosis. Whenever in a patient pulmonary tuberculosis is witnessed, anti-T-B treatment is often given to the patient without making further investigation even in patients having negative sputum smears. (Muhan el.,1995).

The diagnosis of probable pulmonary tuberculosis needs a positive nucleic acid amplification test results or a positive smear and radiological findings suggestive of pulmonary tuberculosis, it can affect all organs of the body.it has a wide spectrum of clinical presentation depending the anatomical site involved environmental characteristics such as crowding and social factors including poverty and imprisonment, are associated with increased risk of tuberculosis (Lienhardt et al.,2011)

Prevalence survey is important to know why the adults infected with mycobacterium tuberculosis is not diagnosed and hence treated by the national T.B control programs(Sian et al.,2013).

Today the principal cause of human tuberculosis is Mycobacterium tuberculosis. Other member of mycobacterium tuberculosis complex that can cause tuberculosis include M.bovis, M. microti and M.africanum.M.microti is not known to cause T.B in human, infection with M. africanum is very rare, while, M.bovis has a wider host range and is the main cause of tuberculosis in other animal species. Human become infected by M.bovis usually via milk, milk products or meat from an infected animal (Prasad et al.,2005 and 2008).

T.B is one of the bigger world health problem, specially in developing countries. The causative agent of tuberculosis is Mycobacterium tuberculosis. The sessional farmworkers and migrants are at high risk of becoming infected with TB than the general population(Arcury,2007).

In 2006, 9.2 million new cases of tuberculosis were diagnosed globally, an increase of 100,000 cases compared to the previous years, a fact that researchers attribute to the population increase. In 2006 the world prevalence of TB cases was 14.4 million and 1.7 million people died from the disease (WHO, 2008).

Pakistan is the leading country in the Eastern Mediterranean region (EMRO) where the rate of tuberculosis is high. In this area, approximately 44% tuberculosis cases are to be found. From tuberculosis, nearly two million people die globally, among these 70,000 from Pakistan. Across the country, every year 250,000 fresh causes of TB develop, the disease begins mostly developed in the productive age. Tuberculosis also causes poverty due to the infecting of the working population (Munch, 2003).

TB is a slow-growing facultative intracellular parasite. During infection it is exposed to many different environmental conditions depending on the stage and the complexity of the disease (Manganelli et al., 1999).

It remains a big health problem with global mortality ranging from 1.6 to 2.2 million lives per year. The situation is further complicated with increasing incidence of drug resistant TB (Aftab et al., 2009).

With an estimated annual incidence of over nine million cases, TB is believed to be responsible for more adult deaths each year than any other single infectious agent (WHO, 2009).

The highest burden of disease is currently borne by the less developed countries of Africa and Asia where efforts to control TB are hampered weak health systems and in some settings, by the high prevalence of co-infection with HIV (Corbett et al., 2006).

The recent emergence of multidrug-resistant strain that cannot be cured with standard treatment regimens has served to emphasize the urgency of the situation (Zager and Nemay, 2008, Zignol et al., 2006).

Tb is one of the most common infectious disease of developing countries including Pakistan, India, Bangladesh, Afghanistan and Nepal (Blumberg et al., 2003).

The disease usually affects the lungs, although other organs are also involved. If properly treated, tuberculosis caused by drug-susceptible strains is curable in virtually all cases. If untreated, the disease may be fatal within 5 years in more than half of cases. More than 3.8 million new cases of tuberculosis of all forms (pulmonary and extra-pulmonary), in which 90% from developing countries were reported to the World Health Organization (WHO) in 2001. It is estimated that 8 million new cases

of tuberculosis occurred globally in 2001, 90% of them from developing countries of Asia (5million),Africa (2million) ,Middle East(6 million),and Latin America (0.4).it is also estimated that 1.8 million deaths occurred Nepal so the best way to treat them is proper awareness and it a time medication (Baskota et al.,1998).

In 2000 from tuberculosis,in which 98%are from developing countries. The infection is transmitted to another people by droplets infection. Acquiring infection from already disease person depends upon exogenous factors that may be general contact, sharing environment,Crowding and poorly ventilated rooms are one of most important factors in transmitting tubercle bacilli,since it increase the intensity of contact with a case. Those tuberculosis patients who are open areas and their sputum contains acid fast Bacillus (AFB) have more chances of transmitting the disease to other people (Bilal et al., 2021). These patients which have sputum smear-negative/culture-positive tuberculosis are less infectious, and those which have culture-negative pulmonary disease and extra pulmonary tuberculosis are essentially non-infectious (Sumbal Tariq et al., 2010).

Tb is a chronic, communicable and infectious bacterial disease caused by tubercle bacilli (Cohen,1995).

Tuberculosis is not born disease but it is Ancient and had caused more deaths than any other infectious disease and is know the disease of poor areas where the facilities are not so good, about 95% of these deaths are in the developing countries(Kumarison,1994).

In mid nineteenth century the vaccination of TB (BCG) and improved medical services had effectively accelerated the decline of TB In economically developed countries although in developing countries the situation remain grim (Crofton and Dovgles,1975).

Tuberculosis the world most neglected epidemic” remains a big public health problem in developing countries owing to the poor implementation of control measure. Early detection and effective treatment of smear positive tuberculosis patients has been found to the most cost effective strategy for the control of disease (Akhtar et al.,1990).

Tb has afflicted mankind from the time immemorial. Tuberculosis, is long to be a big cause of mortality as well as morbidity throughout the globe, and from past several year it has remained a most disregarded disease in together developing countries, but now it is attracting restored interest, and significant efforts to revive control activities are currently under way. This is occurring largely because of increased incidence of tuberculosis in many immunodeficiency epidemic countries, the Availability and proven effectiveness of short course chemotherapy and the realization that tuberculosis control is one of the most cost effective health interventions in developing countries (P-sudre et al.,1992).

Discussion

Tuberculosis (TB) is an infectious disease caused by the bacterium *Mycobacterium tuberculosis* that primarily affects the lungs but can also affect other parts of the body such as the kidneys, bones, and brain. It is a major global public health problem that has affected humans for centuries. According to the World Health Organization (WHO), TB is one of the top 10 causes of death worldwide, and it is the leading cause of death from a single infectious agent, ahead of HIV/AIDS. In this discussion, we will explore the prevalence of TB in the overall suspected population of the world and examine its impact on global health.

TB is a highly infectious disease that spreads through the air when an infected person coughs, sneezes, or talks. People who are infected with TB bacteria but do not have active TB disease are said to have latent TB infection (LTBI). They do not have any symptoms and cannot spread the disease to others. However, if LTBI is not treated, it can progress to active TB disease, which is contagious and can be fatal if left untreated.

According to WHO, an estimated 10 million people worldwide fell ill with TB in 2019, and 1.4 million died from the disease. TB is most prevalent in low- and middle-income countries, with 95% of TB deaths occurring in these countries. The WHO African region is the most affected, accounting for about a quarter of all TB cases worldwide. The prevalence of tuberculosis varies widely across different regions of the world, with the highest rates in Africa and South-East Asia, accounting for 42% and 29% of global TB cases, respectively.

The prevalence of tuberculosis varies widely across different regions of the world, with the highest rates in Africa and South-East Asia. According to the WHO, eight countries account for two-thirds of the global burden of tuberculosis: India, Indonesia, China, the Philippines, Pakistan, Nigeria, Bangladesh, and South Africa. In these countries, the prevalence of tuberculosis is highest in impoverished communities where poor living conditions, overcrowding, and malnutrition make people more susceptible to infection.

TB is also a major problem in sub-Saharan Africa, where the disease is closely linked to poverty, malnutrition, and HIV/AIDS. People living with HIV/AIDS are more susceptible to TB because their immune systems are weakened. In 2019, about 8.2 million people were estimated to have both TB and HIV/AIDS, and about 208,000 of these people died from the disease (Bilal & Akbar, 2021).

In recent years, there has been some progress in reducing the global burden of TB. The number of people falling ill with TB has been declining slowly, with a 9% reduction between 2015 and 2019. The

number of deaths from TB has also been declining, with a 14% reduction between 2015 and 2019. However, the progress has been slow, and the targets set by the WHO's End TB Strategy for 2020 have not been met.

The COVID-19 pandemic has also had a significant impact on the global TB response (Bilal & Ullah, 2021). The pandemic has disrupted TB services, including diagnosis and treatment, and has diverted resources away from TB programs. The WHO estimates that the number of people with TB who have not been diagnosed or treated could increase by up to 1.4 million between 2020 and 2025 due to the pandemic (Bilal et al., 2021).

There are several challenges to tackling the global TB problem. One of the main challenges is the lack of access to diagnostics and treatment, particularly in low- and middle-income countries. Many people with TB are not diagnosed or treated, and many of those who are treated do not complete their treatment, which can lead to drug resistance and treatment failure. Another challenge is the high cost of TB drugs, which can be a barrier to access for many people.

Conclusion

In conclusion, tuberculosis remains a significant public health challenge globally, with a high prevalence in low- and middle-income countries. The burden of tuberculosis is particularly high in impoverished communities where poor living conditions, overcrowding, and malnutrition make people more susceptible to infection. Although significant progress has been made in the diagnosis and treatment of tuberculosis, achieving the goal of ending the global epidemic by 2030 will require increased political commitment and investment in tuberculosis control programs.

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