

Tuberculosis (TB)

Introduction

Tuberculosis (TB), also called in the past Phthisis pulmonalis, phthisis or Consumption is fatal and widespread infectious disease caused by different strains of mycobacteria including *Mycobacterium tuberculosis*, *Mycobacterium africanum*, *Mycobacterium bovis*, *Mycobacterium microti* and *Mycobacterium pinnipedii*. Typically, it attacks the lungs but can also spread to other parts of the body. It is spread through the air when infected people sneeze and cough. According to WHO, TB is the second leading killer disease after COVID-19. Roughly 10.6 million people were infected with TB in 2021 which reflects an increase of 4.5% compared to 2020. Estimated TB-related deaths increased from 1.4 million in 2020 to 1.6 million in 2021 ("*2.1 TB incidence*," no date). According to Tuberculosis in England report, 2022, TB incidence in England was 7.8 per 100000. This data is below the World Health Organization (WHO) threshold for a low-incidence country, which is less than or equal to 10 per 100000 incidences. TB notifications have been decreasing in England with the highest decrease being notified in 2020 by 12.3% since 2000 ("*TB incidence and epidemiology in England, 2021*," no date).

Public health Measures available to manage and control/reduce TB

Lie to many other infectious diseases, Prevention is better than cure. There is no sure way of preventing tuberculosis but a number of measures can be put in place to control and reduce disease incidence and prevalence. Tuberculosis control and prevention primarily relies on vaccination of infants, detection and appropriate treatment of confirmed and active cases.

Vaccines

As of 2023, the only existing vaccine for tuberculosis is Bacillus Calmette-Guerin (BCG) and has been in use since 1921. The vaccine is prepared from a weakened strain of bovine tuberculosis *bacillus*, *Mycobacterium bovis*. The vaccine is 80% effective in preventing TB for 15 years and it is more effective against complex forms of TB in children. It is less or has limited effectiveness in the people over 35 years and when given in equatorial regions. This means that, the vaccine confers inconsistent protection against contracting pulmonary tuberculosis. However, as in the UK, where the disease is not experienced much compared to third world countries, BCG is only administered to people at high risk.

Notification/surveillance

In the UK, all forms of tuberculosis are notifiable under the Public Health Act 1984. A doctor suspecting or making the diagnosis has a legal obligation for notification to the relevant officers, usually Consultants in Communicable Disease Control in England and Wales. The purpose of notification is twofold: it triggers contact tracing procedure, which is a crucial step in documentation and makes it possible to screen close contacts with active disease that need prompt treatment or to put those who need chemoprophylaxis in appropriate intervention. The second reason for notification is to provide surveillance data to monitor and detect trends in epidemiology to plan for treatment and preventive measures (Society*, 2000).

Isolation

In hospitals, schools and families, screening and isolation of infectious cases are crucial. Isolation in a well ventilated room reduces the chances of spreading Tuberculosis to healthy family members and other people in public rooms (Karyani *et al.*, 2016).

Treatment, when a person has active TB, he/she must get treated right away by taking a number of medications for 6 to 12 months.

Infected persons are given the following recommendations to protect others from the disease: Taking medicines as prescribed and attending all doctor appointments; keeping the mouth covered with a tissue as one coughs or sneezes and then dispose it; washing hands after sneezing and coughing; avoiding to invite people and visiting other people; staying home from school, public places or work; avoiding the use of public transportation; and using a fan or opening windows for effective air circulation (Contributors, no date).

Key determinants/risk factors of Tuberculosis

Preventive measures are not enough to control and prevent contraction of tuberculosis. Therefore, anyone can get the disease. However, certain conditions or factors can increase the risk of the disease. These are:

Travelling or living in certain areas – the risk of contracting tuberculosis is higher when people travel to or live in places where TB incidence and prevalence is high like sub-Saharan Africa, Pakistan, and India (Narasimhan *et al.*, 2013).

Weakened Immune system - compared to a healthy person, a person with weak immune system has reduced ability to fight TB bacteria. A number of diseases and medications can weaken one's immunity and they are; diabetes, HIV/AIDS, certain cancers, end-stage kidney

disease, chemotherapy, drugs used to treat rheumatoid arthritis; malnutrition; drugs used to prevent rejection of transplants; and very young or advanced age (Narasimhan *et al.*, 2013).

Poverty and substance abuse – Alcohol abuse or substance abuse and tobacco use weakens immune system and therefore makes one more vulnerable to the disease. Similarly, lack of medical care due to low income, living in remote areas, and homelessness makes people lack access to essential medical services (Narasimhan *et al.*, 2013).

Place of work or residence – Healthcare workers who are in regular contact with TB patients are at a high risk of contracting the disease due to the high risk exposure. Therefore, they normally wear masks and gloves to reduce the risk. In addition working or living in residential care facility like prisons, nursing homes, immigration centres and Asylums are at a higher risk to be infected by the disease as the disease spreads faster in an overcrowded area (Narasimhan *et al.*, 2013).

There is also a genetic risk factors associated with TB. However, the overall importance is undefined (Narasimhan *et al.*, 2013).

Ignorance – though vaccination is a major breakthrough in the world to prevent the disease, some people may ought not to take their children for vaccination. These children could not stand a chance when exposed to the bacteria (Narasimhan *et al.*, 2013).

Social-economic and Behavioural Factors – Research has shown that there is a relationship between a person's susceptibility to infection. For instance, the burden of TB follows a strong socio-economic gradient within and between countries with the poor people having the highest risk (Narasimhan *et al.*, 2013).

Short-term public health consequences of TB in a health or social care setting.

Tuberculosis is a public health threat for many years and remains a top killer throughout the world. The discovery of drugs 50 years ago that can cure tuberculosis was a greatest breakthrough, but still TB continues to be a great threat to the health of populations. The public health effects due to Tuberculosis affect individuals, families, communities, the society and governments. Hospital settings are especially directly affected by the disease as it is a point crowds of people meet for treatment and to see their lovely one. Therefore, the effects of TB in hospitals and social care settings is direct and imminent (Farias *et al.*, 2013). Some of the effects are short time and others long term. The short term effects of Tuberculosis include:

One third of the global population is infected by tuberculosis and the 90% of the infected persons do not develop the disease but they harbour it. In addition, the 10% fall ill later of soon after infection as immune systems became weaker. Without any treatment, half of these people die. When there is an outbreak, hospitals are burdened with Tuberculosis related visits and this poses an immediate threat to the hospital staff and patients. Tuberculosis poses a greater risk to people who suffer from malnutrition or HIV and other forms of diseases. Over 12 million people throughout the world have been affected by HIV and many of them die as a result of TB. Moreover, statistics show that over 60% of Tuberculosis patients are also HIV-Positive in some parts of Sub-Saharan Africa and a rise of these figures has been detected in the Asian Countries. This poses an immediate pressure to Public health in terms of coming up with strategies to screen, detect, prevent and control the danger posed by the high rates of TB cases. In addition, Public health may face some short-term effects on the part of drug availability and accessibility. With an increase in the widespread of TB, hospitals face the impending drug shortages. An outbreak of TB in an area may lead to poor prescriptions of drugs, erratic pill-taking and self-medication. These factors pose a very great threat to the efforts of public health officers to define cases, follow up cases and contact tracing efforts. In terms of cost, the hospitals face challenges in procuring high cost TB drugs. The immediate pressure on procuring TB drugs is a budgetary constraint and this may affect delivery of other hospital services.

Long-term public health consequences of TB in a health or social care setting.

The transmission of Mycobacterium Tuberculosis is a Great risk to healthcare personnel and patients in healthcare setting. It is more likely that transmission will occur from patients with unrecognized larynx or pulmonary related TB and are not in anti-TB therapy and are not placed in isolation. The spread of TB in healthcare and social care settings has been associated with being in close contact with TB infected persons ("*Public Health at a Glance - Tuberculosis Control*," no date).

As mentioned early, erratic pill taking, self-medication, inadequate supply of TB drug regimens, and poor prescriptions contribute to emergence of **Drug-resistant TB** (Valadares, Carvalho and Miranda, 2019). According to recent surveys, multi-drug resistant TB strains are increasing in the world and patients with this type of TB face complex, toxic and high complex treatment, which poses a long term pressure and risk to the health of other patients and doctors. When in complications, the patients may be required to spend a lot of time hospitalized and

this poses long term pressure on hospital capacity to handle other patients ("*Tuberculosis (TB) in Healthcare Settings | HAI | CDC*," 2019).

Public health is committed to a cohesive and cost-effective package of interventions that are accessible through primary health care. However, due to increased TB cases associated with their long term latency. When healthcare workers are infected by TB, they pose not only an immediate risk to other stakeholders but a long-term undetectable infection to patients and core-workers. This phenomenon alone is a danger to the public health hospital based interventions to reduce and eliminate Nosocomial infections ("*Public Health at a Glance - Tuberculosis Control*," no date).

In addition, an outbreak of TB in hospitals may pose a long term effect on handling patients with the need of long term uninterrupted supply of medicines. When the supply chain is interrupted, Hospital based deaths becomes increased.

Factors affecting the health and wellbeing of individuals with TB.

There are numerous factors that affect the quality of life of TB patients (Septiani and Erawati, 2022). According to studies, the quality of life of TB patients is related to medical factors, social support, demographic factors, psychological factors, counselling programs, and educational programs (Kakhki and Masjedi, 2015). In general, TB patients experience poor quality of life and have a great risk of developing depression (Jaber *et al.*, 2016).

There is a relationship between quality of life of TB patients with psychological domain of the quality of life, social relationships, physical relationships, and environmental conditions. Moreover, Sex, age, duration of treatment, income and gender are also great variables that affect the psychological aspect of quality of life for TB patients. Isolation based interventions increase the rate of depression and affect social relations (Juliasih *et al.*, 2020). In addition, other factors like educational level, body mass index, marital status, chronic illnesses and monthly income have a significant effect to a person's quality of life. Juliasih *et al* (2020) concluded in their study that, Comorbidities affected several domains on the health of TB patients including pain, general health, role limitation, physical functioning, mental distress and social wellbeing of TB patients.

Conclusion

Tuberculosis is a disease of public health importance not only in the United Kingdom but throughout the world. It poses a great threat to public health and remains a top killer disease throughout the world despite the discovery of drugs that cure the disease. Public health efforts like vaccination, isolation and other interventions including treatment are not enough to deal with the disease due to factors such as long incubation without real time effect on infected patients who are not under drugs. Tb patients face social, psychological, physical, and medical related quality of life challenges. There is need for increased efforts to diagnose, prevent and control Tuberculosis.

References

2.1 *TB incidence* (no date). Available at: <https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2022/tb-disease-burden/2-1-tb-incidence> (Accessed: 26 March 2023).

Contributors, W.E. (no date) *Tuberculosis Prevention: What to Know*, WebMD. Available at: <https://www.webmd.com/lung/tuberculosis-prevention> (Accessed: 26 March 2023).

Farias, S.N.P. de *et al.* (2013) ‘Completeness in caring: study of quality of life in clients with tuberculosis’, *Escola Anna Nery*, 17, pp. 749–754.

Jaber, A.A.S. *et al.* (2016) ‘Evaluation of Health-Related Quality of Life among Tuberculosis Patients in Two Cities in Yemen’, *PloS One*, 11(6), p. e0156258. Available at: <https://doi.org/10.1371/journal.pone.0156258>.

Juliasih, N.N. *et al.* (2020) ‘Factors Affecting Tuberculosis Patients’ Quality of Life in Surabaya, Indonesia’, *Journal of Multidisciplinary Healthcare*, 13, pp. 1475–1480. Available at: <https://doi.org/10.2147/JMDH.S274386>.

Kakhki, A.D. and Masjedi, M.R. (2015) ‘Factors associated with health-related quality of life in tuberculosis patients referred to the national research institute of tuberculosis and lung disease in Tehran’, *Tuberculosis and respiratory diseases*, 78(4), p. 309.

Karyani, A.K. *et al.* (2016) ‘Self-reported health-related quality of life (HRQoL) and factors affecting HRQoL among individuals with health insurance in Iran’, *Epidemiology and Health*, 38, p. e2016046. Available at: <https://doi.org/10.4178/epih.e2016046>.

Narasimhan, P. *et al.* (2013) ‘Risk Factors for Tuberculosis’, *Pulmonary Medicine*, 2013, p. e828939. Available at: <https://doi.org/10.1155/2013/828939>.

Public Health at a Glance - Tuberculosis Control (no date). Available at: http://web.worldbank.org/archive/website01213/WEB/0__CON-9.HTM (Accessed: 27 March 2023).

Septiani, F. and Erawati, M. (2022) 'FACTORS AFFECTING THE QUALITY OF LIFE AMONG PULMONARY TUBERCULOSIS PATIENTS: A LITERATURE REVIEW', *Nurse and Health: Jurnal Keperawatan*, 11(1), pp. 57–69.

Society*, J.T.C. of the B.T. (2000) 'Control and prevention of tuberculosis in the United Kingdom: Code of Practice 2000', *Thorax*, 55(11), pp. 887–901. Available at: <https://doi.org/10.1136/thorax.55.11.887>.

TB incidence and epidemiology in England, 2021 (no date) GOV.UK. Available at: <https://www.gov.uk/government/publications/tuberculosis-in-england-2022-report-data-up-to-end-of-2021/tb-incidence-and-epidemiology-in-england-2021> (Accessed: 26 March 2023).

Tuberculosis (TB) in Healthcare Settings | HAI | CDC (2019). Available at: <https://www.cdc.gov/hai/organisms/tb.html> (Accessed: 27 March 2023).

Valadares, R.M.C., Carvalho, W. da S. and Miranda, S.S. de (2019) 'Association of adverse drug reaction to anti-tuberculosis medication with quality of life in patients in a tertiary referral hospital', *Revista da Sociedade Brasileira de Medicina Tropical*, 53.