

## Tuberculosis, a Milk-Borne Zoonosis: A Critical Review

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### Abstract

Tuberculosis is a widespread infectious disease caused by *Mycobacterium tuberculosis*. Tuberculosis attacks on lungs but also affects the other parts of the body. It is spread through the air when people who have an active Tuberculosis infection cough, sneeze, or otherwise transmit respiratory fluids through the air. Most infections do not have symptoms, known as latent tuberculosis. About one in ten latent infections eventually progresses to active disease which if left untreated kills more than 50% of those so infected. One-third of the world's population is thought to have been infected with *M. tuberculosis* and new infections occur in about 1% of the population each year.

**Keywords:** Milk-borne; Tuberculosis; Zoonosis

### Introduction

More people in the developing world contract tuberculosis because of a poor immune system, largely due to high rates of HIV infection and the corresponding development of AIDS [1,2]. Milk consumed raw is the principal vehicle for the transfer of tubercle bacilli from animals to man, but airborne infection does occur [3,4]. Infected milch cows are most frequent source of the tubercle bacillus, whether Buffaloes, Goats, Sheep, Camels and other ruminants may cause infection. One decade ago in the United Kingdom 17%-18% of all cattle and 30%-35% of cows reacted to tuberculin [5,6]. Tubercle bacilli in milk may be derived from the contaminated environment (Manure, Dust, etc.), but the prime source is an affected udder though it has been shown that bacilli may transmit from blood to milk through normal udders [7-9]. *Mycobacterium* spp. isolated from raw milk of Pastoral cattle of southern highlands of Tanzania [10]. The foregoing incidence of tubercle bacilli in milk was reflected in the prevalence of bovine tuberculosis in man. It was estimated that in 1931 in the United Kingdom there were 2600 deaths from bovine tuberculosis and 6250 notifications [11]. A recent survey in the German Federal Republic indicates the magnitudes of the problem that has been faced in the past by most countries with a highly developed dairy industry or will be encountered by governments when undertaking control and eradication [12]. In the Indo-Pakistan sub-continent and South Africa bovine- type infection in man appears to be practically non-existent where ever a considerable proportion of cows in town dairies are infected [13]. Human- type tubercle bacilli may gain direct access to milk from milkers and other handlers may reach to the consumer in the same way as milk-borne pathogens if they are not eliminated by adequate heat treatment. Infection of cows with human tubercle bacilli also occurs and it has been shown that such cattle may excrete the bacilli in their milk from normal udders [14-16].

### Symptoms

The general symptoms of tuberculosis are Fever, Chills, Night sweats, Loss of appetite and Weight loss.

In case of Pulmonary Tuberculosis: Chest pain and Prolonged cough producing sputum. Occasionally infected person may cough up blood in small amount. Tuberculosis may become a chronic illness and cause extensive scarring in the upper lobes of the lungs.

In case of Extrapulmonary Tuberculosis: In 15–20% of active cases, the infection spreads outside the lungs, causing other kinds of TB [17]. These are collectively denoted as “extrapulmonary tuberculosis” [18]. Extrapulmonary TB occurs more commonly in immunosuppressed persons and young children. When it spreads to the bones, it is known as “osseous tuberculosis” [19], a form of osteomyelitis [20].

### Risk factors

A number of factors make people more susceptible to Tuberculosis infections. The most important risk factor globally is HIV; 13% of all people with TB are infected by the virus [21]. This is a particular problem in sub-Saharan Africa, where rates of HIV are high. Of people without HIV who are infected with tuberculosis, about 5–10% develops active disease during their lifetimes [22]. In contrast, 30% of those co-infected with HIV develop active disease [22]. Tuberculosis is closely linked to both overcrowding and malnutrition, making it one of the principal diseases of poverty. Those at high risk thus include; people who inject illicit drugs, inhabitants and employees of locales where vulnerable people gather (e.g., prisons and homeless shelters), medically underprivileged and resource-poor communities, high-risk ethnic minorities, children in close contact with high-risk category patients, and health-care providers serving these patients.

### Prevention and control

The control of milk-borne tuberculosis depends on these important factors:

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1. Eradication of the infection from dairy animals.
2. Health control of milk handlers.
3. Adequate heat treatment of milk.
4. Don't drink raw milk.
5. Keep dairy products refrigerated within the expiration date marked on the package.
6. Be careful when you travel to developing nations, follow the recommended sanitary precautions for the country you are in and do not eat raw dairy products.

### Vaccines

Tuberculosis vaccines and BCG Vaccines.

### Treatment

Treatment for Tuberculosis will involve a long course of antibiotics till several months. While Tuberculosis may be fatal if left untreated, deaths are rare if treatment is completed.

**Pulmonary tuberculosis:** If patients are diagnosed with active pulmonary Tuberculosis (Tuberculosis that affects lungs), patients will be given a six-month course of a combination of antibiotics. The course of treatment is:

Two antibiotics (Isoniazid and Rifampicin) every day for six months.

1. Two additional antibiotics (Pyrazinamide and Ethambutol) every day for the first two months.

**Extrapulmonary tuberculosis:** Extrapulmonary Tuberculosis (Tuberculosis that occurs outside the lungs) can be treated using the same combination of antibiotics as those used to treat pulmonary Tuberculosis. However, patients may need to take drug for 12 months.

### References

1. World Health Organization (2002) "Tuberculosis".

2. Lawn SD, Zumla AI (2011) Tuberculosis. *Lancet* 378: 57-72.
3. Francis J (1958) Tuberculosis in Animals and Man London, Cassel.
4. Jensen KA (1953) In: Advances in the control of zoonoses, Geneva (World Health Organization: Monograph Series, No. 19).
5. Ritchie JN (1946a) Proc. Royal Soc. Med. 39: 216.
6. Ritchie JN (1946b) Vet. Rec 58: 45.
7. Griffith F, Griffith AS (1911) In: Royal Commission on Tuberculosis, Final Report, London, Darling and Son.
8. Francis J (1951) Some observations on infection of the bovine udder with *Mycobacterium tuberculosis* and *Corynebacterium pyogenes*. *J Comp Pathol* 61: 161-167.
9. Nassal J (1957) Rindertuberk. *Brucell* 6: 55.
10. Kazwala RR, Daborn CJ, Kusiluka LJM, Jiwa SFH, Sharp JM, et al. (1998) Isolated *Mycobacterium* Species from raw milk of pastoral cattle of the Southern highlands of Tanzania (*Tropical Animal Health and Production*) 30: 233-239.
11. Great Britain (1934) Economic Advisory Council Committee on Cattle Diseases. Report, London, H. M. Stationery Office.
12. Meyn A (1957) Rindertuberk. *Brucell* 6: 185.
13. Sampson BF (1943) *Brit. Med J* 1: 708.
14. Mitscherlich E, Reuss V (1953) *Dtsch. Tierarztl. Wschr.* 60: 387.
15. Nassal J (1956) Rindertuberk. *Brucell* 5: 189.
16. Schliesser T (1958) Rindertuberk. *Brucell* 7: 102.
17. Jindal SK (2011) Textbook of pulmonary and critical care medicine. New Delhi: Jaypee Brothers Medical Publishers, India.
18. Golden MP, Vikram HR (2005) Extrapulmonary tuberculosis: an overview. *Am Fam Physician* 72: 1761-1768.
19. Vimlesh Seth SK (2006) Essentials of tuberculosis in children (3rd edn) New Delhi: Jaypee Bros. Medical Publishers, India.
20. Kumar V, Abbas AK, Fausto N, Mitchell RN (2007) Robbins Basic Pathology (8th edn) Saunders Elsevier. 516-522.
21. World Health Organization (2011). The sixteenth global report on tuberculosis" (PDF).
22. Gibson G; Section editors, Michael Abramson et al. (2005) Evidence-based respiratory medicine (1. publ. ed.). Oxford: Blackwell.