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Bovine Tuberculosis in Nigeria: A Review

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Abstract: Nigeria is one of the African countries where bovine tuberculosis is wide spread in both cattle and humans. Although, the current status on the actual prevalence rate of bovine tuberculosis at a national level is unknown but from the limited survey research which have been reported over the last 30 years in the country, the prevalence of bovine tuberculosis due to *M. bovis* ranges from 2.5% in 1976 to 14% in 2007 which shows that the prevalence of the disease has been on the increase. The isolation and identification of *Mycobacterium bovis* in fresh and sour milk as sold in local market, sputum and tissue samples from humans especially among Fulani herdsmen, abattoir and slaughter houses has been reported what has therefore been established is that bovine tuberculosis occurs in cattle and humans in Nigeria.

Key words: Bovine, tuberculosis, public health, contagious disease, chronic infection, Nigeria

INTRODUCTION

Bovine Tuberculosis (BTB) is a chronic infectious and contagious disease of both domestic and wild animals including humans (Radostits *et al*., 2002). It is characterized by the formation of granulomas in tissues and organs, more significantly in the lungs, lymph nodes, intestines, liver and kidneys (Shitaye *et al*., 2007). Bovine TB is caused by a slowly growing bacillus which is a member of the *Mycobacterium tuberculosis* complex.

Though, primarily a bovine problem but infect and causes TB in camels, pigs, sheep, goats, horses, dogs, cats, badgers, lions, elephants, deer, primates and man (Ayele *et al*., 2004). Bovine TB has been widely distributed throughout the world with a serious effect on animal production. The disease is zoonotic and therefore of public health significance (O'Reilly and Daborn, 1995). Although, the direct correlation between *Mycobacterium bovis* infection in cattle and human populations is not well known (Collins and Grange, 1983; Cosivi *et al*., 1995) however, zoonotic BTB is present in most developing countries where surveillance and control activities are often inadequate or unavailable (Cosivi *et al*., 1995). The actual impact of animal BTB on human health is generally considered low in developing countries like Nigeria which may be based on the rare identification of *M. bovis* isolates from human patients (Amanfu, 2006).

In Africa, the occurrence of BTB due to *M. bovis* in humans is difficult to determine accurately because of technical problems in isolating the microorganism (Collins and Grange, 1983). Currently, BTB in humans is becoming increasingly important in developing countries like Nigeria as humans and animals are sharing the same micro-environment and dwelling premises especially in rural areas (Abubakar, 2007). At present due to the association of TB with the HIV/AIDS pandemic and in view of the high-prevalence of HIV/AIDS in the developing world and the prevalence of humans TB due to *M. bovis* is likely to change (Amanfu, 2006). The epidemiology and public health significance of bovine TB in Nigeria remain largely unknown however, few laboratories in the country are capable of differentiating *M. bovis* from *M. tuberculosis* and other members of the *M. tuberculosis Complex* (MTC) (Cadmus *et al*., 2004). The primary source of infection for humans are consumption of unpasteurised milk and prolong close association between humans and animals.

Rural inhabitants and some urban dwellers in Nigeria still consume unpasteurized and soured milk potentially infected with *M. bovis* (Abubakar, 2007). The problem of *M. bovis* in Nigeria may to some extent, mimic the pre-eradication period in Europe before the 1960s where the prevalence of bovine TB in the human population was relatively high (Pavlik *et al*., 2002). Abdulkadir underlines the urgent need to develop and build scientific capacity in Nigeria to improve health nationwide and curb the global spread of tuberculosis and cited poor governance, poor planning, poor accountability, poor

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commitment and failure to conduct research in bovine tuberculosis as the main obstacles in controlling this disease in Nigeria and Africa in general. The main purpose of this study is to highlight the where we are on bovine tuberculosis and factors responsible for the persistence of bovine TB in Nigeria. Nigeria is one of the African countries where BTB is considered as a protruding disease of animals (Cadmus *et al*., 2007). Detection of BTB in Nigeria is carried out most commonly on the basis of tuberculin skin testing, abattoir meat inspection and rarely on bacteriological techniques however, the current status on the actual prevalence rate of BTB at a national level is unknown because in Nigeria, screening of cattle by the tuberculin skin test was sporadic (Abubakar, 2007).

The human cases of tuberculosis associated with *M. bovis* infection, both pulmonary and extra-pulmonary have been described in Nigeria (Idigbe *et al*., 1986; Cadmus *et al*., 2004; Abubakar, 2007). From the limited survey research which have been reported over the last 30 years in the country, prevalence of bovine tuberculosis due to *M. bovis* ranges from 2.5% in 1976 to 14% in 2007.

The disease has been on the increase as demonstrated by the tuberculin test reports of Alhaji (1976), Ayanwale (1984), Shehu (1988) and Abubakar (2007). The isolation and identification of *M. bovis* in fresh and sour milk as sold in local markets was also reported (Alhaji, 1976; Shehu, 1988; Okolo, 1992; Abubakar, 2007). There have been several reports of isolation and identification of *M. bovis* from sputum and tissue samples from humans especially among the Fulani herdsmen with or without clinical signs of tuberculosis (Idigbe *et al*., 1986; Cadmus *et al*., 2004, 2006; Abubakar, 2007).

Lung tissues and lymph nodes of cattle from abattoir and slaughter houses have yielded *M. bovis* in majority of cases with few other mycobacteria such as *M. tuberculosis* and *M. africanum* as occasional findings (Cadmus *et al*., 2006, 2007; Abubakar, 2007). What was therefore established based on these limited studies is that *M. bovis* infection occurs in cattle and humans and the modes of transmission are both direct and indirect with the highest prevalence of the human *M. bovis* infection in the cattle herdsmen, abattoir workers and other handlers of livestock and livestock products.

The rate *M. bovis* infection among the general public is unclear but these limited surveys have indicated high possibility through direct contact with infected and diseased herdsmen as well as through drinking raw and fresh or sour milk as sold in the local markets. The proportion of human tuberculosis due to *M. bovis* is unknown because in Nigeria diagnosis of tuberculosis stops at the smear level, hence the species involve in causing the disease are not known thereby making it difficult to study outbreaks, trace the routes of transmission and also know the strains of mycobacterium involved (Abubakar, 2007). The advent of HIV/AIDS infection has increase the prevalence of the disease and there is the at moment no data on the prevalence of *M. bovis* isolation among HIV/AIDS positive patients in the country.

FACTORS RESPONSIBLE FOR THE PERSISTENCE OF BOVINE TUBERCULOSIS IN NIGERIA

Bovine tuberculosis control in Nigeria: The control of BTB in Nigeria is regulated by the Federal Ministry of Agriculture. However, this control policy as stated in the Animal Diseases (Control) Decree of 1988 is poorly or inadequately implemented in recent years. This is largely due to politico-economic reasons such as high cost of sustainable testing and slaughter of infected animals and the subsequent compensation to farmers.

Added to this is the problem of social unrest due to political instability and ethnic wars especially between the Fulani herders and local farmers, resulting in the displacement of large number of humans and animal populations (Ayele *et al*., 2004).

Lack of adequate veterinary services: Poor implementation of control measures such as rigorous meat inspection at abattoirs, poor communication networks, insufficient collaboration with neighbouring countries, lack of quarantine and smuggling of life animals across state boundaries have also been identified to cause problem in controlling bovine tuberculosis in Nigeria (Abubakar, 2007).

Eating habit and living standered of families: For most urban areas particularly in Northern part of the country, milk is considered the main vector for infection by bovine TB while farmers and abattoirs workers are mostly exposed to aerosol infection by close contact with infected animals. For most rural African populations, consumption of raw milk and milk product and close association between animals and farmers are common and this encourages exposure to *M. bovis* through both alimentary and respiratory routes (Anonymous, 1994). The following factors contribute to the acquisition of bovine tuberculosis in farmers and urban dwellers:

- Family ownership of cattle
- Previous livestock ownership
- History of working with animals
- Living with a relative who owns cattle
- Consumption of unpasteurized milk and raw or poorly cooked meat

Diagnosis: Most importantly also, diagnosis of tuberculosis in Nigeria stops at the smear level hence the species involved in causing the disease are not known thereby making it difficult to study outbreaks, trace the routes of transmission and also to know the strains of mycobacterium involved.

Another major setback is the inability of the national TB control program to recognize the significance of *M. bovis* which is a major public health problem and the general lack of collaboration between human and veterinary medics in this regards (Abubakar, 2007).

HIV/AIDS-associated human TB due to *M. bovis*: Tuberculosis and other Mycobacterial infections are major opportunistic infections in HIV/AIDS infected individuals while HIV/AIDS is a major predisposing factor for TB including reactivations of the disease (Raviglione *et al*., 1995). The current spreading pandemic of HIV/AIDS infection in developing countries like Nigeria, especially where bovine TB is prevalent in domestic and wild animals, poses an additional serious public health problem (Daborn *et al*., 1996).

Literacy: Another, yet unsolved social problem in most rural communities of Nigeria is illiteracy. Inability to read and write and failure to utilize modern methods of animal husbandry makes prevention and control of bovine tuberculosis in Nigeria difficult (Abubakar, 2007).

CONCLUSION

Bovine tuberculosis is a significant zoonotic pathogen that aggravates the triple trouble of HIV/AIDS (Raviglione *et al*., 1995). International market requirement in trading of animals and their product requires high standard hygiene food animal's production (Collins and Grange, 1983). Therefore, African countries such as Nigeria need to control and eventually eradicate bovine tuberculosis (Cadmus *et al*., 2007). Information about zoonotic diseases and their potential impact on human health should be disseminated appropriately in developing countries like Nigeria.

RECOMMENDATIONS

The following measures are suggested for bovine TB:

- For enabling enforcement of control measures, there is need for legislation that makes it obligatory to designed, test and slaughter policy with adequate compensation to avert the spreading of bovine tuberculosis in Nigeria. It is important to take strict control and quarantine measures during the importation of animals and animal products
- While pasteurization of milk is essential to render milk free of *M. bovis* for human consumption this option is not applicable in rural Nigerian communities due to lack of infrastructures and traditional use of milk: this custom should be eradicated by educating the public to boil milk before consumption
- Proper meat inspection should be conducted at all abattoirs and slaughter slabs to reduce the chances of *M. bovis* transmission to humans, thoroughly cooking meat would reduce the human TB due to *M. bovis* and other food-borne infectious diseases. There is also the need to have qualified veterinary staff at the abattoirs and slaughter slabs so that quality data can be generated for effective control measures
- Economic and technical assistance by developed countries is essential to promote control of TB in general and of bovine TB in particular
- In the context of global eradication of TB, elimination of bovine TB in domestic and wild animals could be considered as a long term objectives for African countries such as Nigeria

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