

GARBA and GALADIMA: *Mycobacterium* Infection in cattle and relations of Tuberculosis Patients in Sokoto, Nigeria

AN IN-CONTACT STUDY OF MYCOBACTERIUM INFECTION IN CATTLE AND RELATIONS OF TUBERCULOSIS PATIENTS IN SOKOTO, NIGERIA

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SUMMARY

The aim of this study was to determine the epidemiological link between tuberculosis in livestock and man in a livestock rearing community. This was done through a follow up of human patients, diagnosed with clinical tuberculosis at the Sokoto Specialist Hospital, to their residences and carrying out tuberculin test on their domesticated animals and human contacts. From the human patients, tubercle bacilli were isolated through bacteriological examination while the single cervical comparative tuberculin test was conducted for the animals. Findings revealed that mycobacterium species isolated from the human patients were *M. tuberculosis* 9; *M. bovis* 4 and atypical mycobacterium 3. Patients' relation reacted to Mantoux test showing 50% infection rate. The comparative tuberculin test conducted showed that 4 reacted to *M. tuberculosis* 5 to *M. bovis* and 7 no reaction. The animals kept in the household of the patients showed reaction to tuberculin PPD which suggest that the causative organism in the patients and that infecting the animals are the same species. There is a need to undertake an in-depth study into transmissibility of tuberculosis between livestock and man within a household.

KEY WORDS: In-contact, *Mycobacterium* Infection, Cattle, Tuberculosis Patients

INTRODUCTION

The re-emergence of tuberculosis in developed nations of the world has been ascribed to various factors such as immigrant communities, and the HIV infection. (Dolin 1994). In developing countries the incidence of the disease has continued to increase because all the prevailing factors of the disease such as poverty, malnutrition, HIV infection abound (WHO, 1994).

Because of the wide range of hosts that can be infected by the species of Mycobacterium organisms, the control of tuberculosis will be impracticable without an attempt to understand, as much as possible, the source of the causative agents(s).

In Nigeria, contact between livestock and man is so close to the extent that herds are sometimes kept in very close proximity to human residences. In some cases animals are housed in the same premises with humans (Garba, 2002). Furthermore, in Sokoto town, the extended family system is such that relations identify with the sick such that they see no reason to stay away from them irrespective of the contagious nature of the disease. This study examines the spread of tuberculosis between human and cattle against this background. Report a study from the Monze district of Zambia suggests that herds of cattle from household reported with human tuberculosis are more likely to have tuberculin positive animals than herds in households without reported human tuberculosis (Cook *et al.*, 1996). However, to date, no direct evidence of epidemiological link has been demonstrated (Grange, 1996).

The Zambian study and similar report from Tanzania appear to stress the serious threat posed to animal and human health by tuberculosis of bovine origin worldwide especially in developing countries. The report also raises several issues, which need to be addressed urgently at national levels (Grange, 1996). These issues include the extent of tuberculosis amongst in contact animals; the magnitude of tuberculosis due to *M. bovis* in human populations; the threat tuberculosis to cattle by man and vice versa and on the other hand the transmission of *M. bovis* from human to human.

It has therefore become necessary to determine the epidemiological status of these food animals in a desire to control the disease. The paper therefore presents a report of a probable link between causative species of Mycobacterium in some hospital patients in Sokoto, their relations and the animals they keep in their houses.

MATERIAL AND METHODS

Patients' Relation

The study was undertaken in Sokoto. Sokoto is the capital of Sokoto State in North West Nigeria. Sputum was collected from hospitalized patient and their relations who consented to their being used for the research. In all 16 patients and 18 relations made up of 6 house wives, 5 children, 1 husband, 2 mothers, 1 father, 2 sisters and 1 brother.

The samples were transported in "coolers" packed with ice to the laboratory and stored for screening using the Ziehl-Neelson (Z-N) staining technique for acid-fast bacilli. Further analyses of sputum of the patients were done through bacteriological culture and biochemical test to determine the type of tubercle bacilli involved in the disease in the patients. The Mantoux test using a pre-diluted solution in strength of 0.001/gm proteins per 0.01ml of Purified Protein Derivative (PPD) (supplied by the World Health organization as part of its health-assisted programme to developing countries) was applied to test the individuals. About 0.1ml of the tuberculin solution was injected intradermally at the volar surface of the forearm. The test was read 72 hours after the injection using a plastic ruler. An induration of less than 10mm was recorded as negative while indurations greater than 10mm were measured as positive (Ogunmekan, 1984).

In-Contact Animals

A contact tracing procedure was designed to find out if there would be a relationship between households that rear animals and incidence of tuberculosis. Animals kept in the same compound with the selected patient were investigated by the comparative cervical

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tuberculin test using bovine and avian PPD. The procedure for the test was as described by Abdulkadir (1989).

The result of the comparative cervical tuberculin test on animals kept in the houses of the patients

RESULTS

The result of the Ziehl-Neelson, Sputum test and Mantoux test conducted on patients relations showed that of the 18 relations of the tuberculosis patients, 2 were positive by the Z-N and 9 by the Mantoux test, representing 11.11% and 50% respectively. The result further showed that 4 out of 6 wives who attended to their husbands reacted positively to the Mantoux test (Table I)

TABLE I: The prevalence of Mantoux reactors in relations of tuberculosis patients

Relation to Patients	Total No.	Reaction to Mantoux Sampled	
		Positive	Negative
Wife	6	4	2
Children	5	1	4
Parent	3	2	1
Husband	1	1	0
Sister	2	0	1
Brother	1	1	1

$\chi^2 = 4.035; df = 5; P > 0.05$

TABLE II: Cross match between *Mycobacterium* species isolated from patients and tuberculin reactions of animals in the household

Organism isolated from tuberculosis patients	No. of animals (Tuberculin reaction)			
<i>M. bovis</i>	3	1	1	5
<i>M. tuberculosis</i>	0	4	0	4
No reaction	1	4	2	7
Total	4	9	3	16

$\chi^2 = 83.4; df = 4; P < 0.05$

DISCUSSION

From the contact study, the wives of patients were shown to be at a higher risk of contacting diseases than most other relations. This could be as a result of the fact that the responsibilities of caring for the husband more with the wives or the women than it was for other relations. Contrarily parents of female patients tended to be more at risk of contacting the disease.

There is a high association between the organisms isolated from patients and the PPD reacted to by the cattle they keep suggesting the same source of infection to either. This is consistent with the findings of Cook (1996) who found that herds of cattle from household infected with human tubercle bacilli are more likely to be tuberculin positive to human PPD. Tuberculin test conducted on livestock owned and in close contact with tuberculosis patients, indicated that the animals, reacted to the same tuberculin of the organism isolated from the patients. In a related study in Mexico, a similar relationship was established between tuberculosis in man and livestock management systems where the animals are kept in very close contact to humans could increase the risk in the transmission of tuberculosis from man to animals and vice versa with either serving as a source of infection for the other.

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