



**SERO-PREVALENCE OF BRUCELLA ABORTUS
ANTIBODIES IN SLAUGHTERED CATTLE AND
MEAT BY-PRODUCT HANDLERS IN ILORIN
ABATTOR, KWARA STATE, NIGERIA**

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Full Length Research

Sero-prevalence of *brucella abortus* antibodies in slaughtered cattle and meat by-product handlers in Ilorin abattior, Kwara state – Nigeria

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Growing concern over the increasing number of women participation in post slaughter and meat by- product processing in Ilorin slaughter slab necessitated this study over a three month period in the year 2011. This was to establish the occurrence and possible effect of *Brucella abortus* infected blood on this vulnerable group. Sera obtained randomly from blood of slaughtered cattle fortnightly were screened for *Brucella abortus* antibodies using Rose Bengal Plate test (RBPT) and Microtitre Serum Agglutination test (MSAT) in accordance with standard methods. Out of the total of 261 cattle screened 10 (3.8%) were positive with 6 (2.3%) cows and 4 (1.5%) bulls. Amongst these positive cattle, white Fulani (Bunaji) breed showed the most infected 8(3.0%) and 2 (0.8%) in Sokoto gudali (Bokoloji) breed. Further analysis of sera by MSAT showed all the 3 (1.1%) positive were female white Fulani cattle. Cattle breed and sex showed association with the disease. Oral interview with a cross section of these women revealed that blood collected is processed into various meals for fish, pigs, dogs, poultry and the human delicacy popularly called “siki” as means of revenue generation and livelihood. Attempts to collect blood specimens from these workers for *Brucella* antibody screening yielded no positive efforts. In conclusion, this finding indicates the occurrence of *Brucella abortus* in cattle and by implication the possibility of transmission to these women and other domestic animals. Public awareness especially amongst vulnerable group on the potential dangers as well as creating and promoting women entrepreneurship in other economic sectors that have minimal occupational health risk factors is thus recommended.

Key words: sero-prevalence, *Brucella abortus* antibodies, slaughtered cattle, meat by-product handlers, Ilorin kwara state.

INTRODUCTION

Brucellosis is still one of the most important and wide spread zoonosis worldwide (Poester, et al., 2002) with extensive morbidity in humans especially in butchers (Cadmus et al., 2006) and estimated cattle economic losses to the excess of 140 million Naira (Esuruoso, 1979). This disease is a chronic and highly contagious bacterial zoonosis of ruminants and man, which is characterized by recurrent abortions and infertility in a variety of animal species and undulating fever in man (Halle and Ajoji, 1997). It is caused by a fastidious, facultative intracellular non spore forming, non- motile gram negative coccobacillus bacterium of the genus

Brucella. Nine species are currently recognized within the genus *B. abortus*, *B. melitensis*, *B. suis*, *B. ovis*, *B. canis*, and *B. neotamae* (Corbel and Morgan, 1984). This organism is encountered through ingestion or direct contact with infected animal and or animal by –product such as meat, milk, hide or wool. Infection can also result through contact with infected aborted materials such as aborted fetuses, placenta membranes or fluids and other vaginal discharges, hygroma fluid as well as through the use of infected semen in artificial insemination (Bale, 1999). Therefore, brucellosis in animals is considered a reproductive and herd problem causing low conception

rate, low calving rates, calf survival rates and abortion characterized by reduced fertility (Esuruoso, 1979) and by implication the possible causes of serious public health hazards (Adamu et al., 2007). The disease spread is on the increase despite efforts made by government at improving livestock industry (Eze, 1978; Ocholi, 2003) as the knowledge of farmers, and the entire general public is generally poor which has been associated with consumption of unpasteurized or non-heated milk (Junaidu and Junaidu, 2005). To improve livestock production and reduce the risk of spread in humans more works needs to be conducted on the prevalence and isolation of brucellae from animals and humans in various parts of the country. This will encourage policy makers to enact and enforced sustainable control policy and intervention strategies for the disease. Serological surveys of animal brucellosis have been conducted by some researchers in different parts of the country, Esuruoso and Hill, (1971), Bawa, et al., (1987), Zaria et al., (1990), Egbe- Nwiyi, (1999), Junaidu, et al., (2008). However, the paucity of documented information in Ilorin, kwara state necessitated this study, which seeks to establish the prevalence of the brucellosis in slaughtered cattle at the 'Oja Titun' slaughter house as well as the implication of *Brucella* infected carcass on the meat handlers (especially women) and the general public.

MATERIALS AND METHODS

Study area

Ilorin is the capital of Kwara state which is also referred to as the 'gateway' state because of its location between the Northern and Southern parts of Nigeria. This state is a first order administrative division located on the longitude N 8° 30' 0" and latitude E 5° 0' 0" 8.5 / 5 (Geo Name Id : 2332785) (Anon, 2010). Kwara state shares common boundaries with Niger and Sokoto States to the North, Oyo, Ondo and Bendel States to the South, Benue, Plateau and Federal Capital Territory to the East. It maintains an international boundary with the Republic of Benin to the West. The slaughter house is popularly called "Ipata" located inside the market (Oja Titun) with Geo reference location N0.850065 and E004.56139 on 290m above sea level.

Study design

Convenient random sampling method was employed every forth night over the period of three months (January-March, 2011) in the slaughter house for the collection of blood from slaughtered cattle for separation into sera in this study. Sex and breed were being noted as blood sample were collected.

Study population/animals: All the cattle that were brought for slaughter at the slaughter slab from other northern states through the ilorin cattle market were used for this investigation. These animals are kept in the lairage on arrival to rest for a minimum of 24-48hrs depending on the travel distance, traumatic injuries and

the consent of cattle owner before slaughter. The livestock superintendent is notified prior to slaughter of these cattle.

Sample collection

Five milliliters of blood was collected from the jugular vein of each animal post slaughter using 5mls plain sample bottles and kept at room temperature at an angle of 45° for 6-8hrs to allow for clotting and separation. The sera was aspirated into new set of 5mls plastic tubes, labeled, stored on ice pack and transported to the laboratory, National Veterinary Research Institute, Vom where it was kept at -20°C until use.

Serological procedures

Rose Bengal Plate Test (RBPT) and Mircotitre serum agglutination test (MSAT) were performed as described by Alton et al., (1988) using antigens obtained from Central Veterinary Laboratories Agency, Surrey, Weybridge, United Kingdom. The RBPT was used as screening test and interpreted as positive when agglutination were observed visually which was further subjected to MSAT to quantify the antibody titer. Negative and positive controls were included in the MSAT and titers of 1:20 or 1:40 and above were considered positive for *B. abortus* antibodies.

Participatory appraisal

Oral interview as described by McCracken, (1988) was conducted with a cross section of the women in order to gather data during this epidemiological research and disease surveillance as reported (Jost et al., 2007). The information included reproductive status and capacity of the women, the purpose of engaging in the occupation, level of awareness on health hazards, preventive measures put in place and their willingness to donate blood for *Brucella* screening.

Data analysis

All data was expressed as frequency and percentage, which was further subjected to Chi square analysis

RESULTS

Out of the total of 261 sera screened for the period under review 10 (3.8%) was positive for *Brucella abortus* antibodies by RBPT (Table 1). Further analysis by MSAT showed that all the 3 (1.1%) sera were from white Fulani cows as 2 sera revealed a titre 1:40 and 1 serum with 1:80 (Table 2). Sex distribution showed that out of 261 the screened cattle 169 of was female and 92 males with frequency rate of 64.75% and 35.25% respectively with 6 (2.3%) cows and 4 (1.5%) bulls been positive for *Brucella* antibody by RBPT (Table 1). The two major breed of cattle observed during the study was the white Fulani (201) and the Sokoto gudali (60) which showed the more *Brucella* infections occurred in white Fulani 8(3.0%) and 2 (0.8%) in Sokoto gudali (Bokoloji) cattle sera (Table 2). Both sex and breed had association with disease by chi square analysis.

Oral interviews with a cross section of these women revealed the engage in this job as a means of livelihood, with little or no awareness on the possible danger

Table 1: Sex distribution of *Brucella abortus* antibodies in slaughtered cattle

Test	Sex	Brucella positive	Brucella negative	Total
RBPT	Male	4	88	92 (35.25%)
	Female	6	163	169 (64.75%)
Total		10 (3.8%)	251 (96.2%)	261 (100%)
MSAT	Male	-	92	92 (35.25%)
	Female	3	163	169 (64.75%)
Total		3 (1.1%)	258 (98.9%)	261 (100%)

Table 2: Test and Breed distribution of *Brucella abortus* antibodies in slaughtered cattle

Test	Breed	Brucella positive	Brucella negative	Total
RBPT	White Fulani/ Sokoto gudali	10 (3.8%)	251 (96.2%)	261
MSAT	White Fulani	3 (1.1%)	258 (98.9%)	261
Breed		Brucella positive	Brucella negative	Total
White Fulani		8 (3.0%)	193 (74.0%)	201 (77.0%)
Sokoto gudali		2 (0.8%)	58 (22.2%)	60 (23.0%)
Total		10 (3.8%)	251 (96.2%)	261 (100%)

associated with the job, as majority of the respondents are of the myth that cattle blood is of no harm to humans. Further, discussion revealed that they have no preventive plans or protocol in place and attempts to collect blood specimens from these workers for *Brucella* screening yielded no positive efforts. Lastly, they confirmed that blood collected is usually processed into various meals for fish, pigs, dogs, poultry and the human delicacy popularly referred to as “siki”.

DISCUSSION

The occurrence of *Brucella* antibodies in slaughtered cattle in this study (Table 1) area conforms to previous reports for brucellosis in northern Nigeria (Ocholi et al., 1996; Ajoji, 1997; Junaidu et al., 2008; Gusi et al., 2010 and Sahlihu et al., 2011). The occurrence rate of 3.8% recorded in this study is lower than the 5.8% reported by Gusi et al., (2010) for slaughtered cattle in Jos as well as the 6.6% and 19.5% reported by Ocholi, (1990) and Sahlihu et al., (2011) in Fulani herds in Kaduna and Sokoto respectively. This probably suggests that adequate sanitation, treatment and vaccination efforts are ongoing within the herds by the Fulani Pastoralists to enhance the value of their livestock before sales to the cattle dealers and subsequently the butchers. The higher occurrence of brucellosis in female connotes previous reports of Mbuk et al., (2011) and Sahlihu et al., (2011) as cows serve as reservoir of *Brucella* organism which is supported by high quantity of D-erythritol produced in fetal tissues especially in pregnant animals (Corbel and Morgan, 1984; Radostitis, et al., 2000). This *Brucella* organism and its antigen can be detected in fetal tissues by avidin-biotin-peroxidase complex immunostaining techniques (Smith, 2009). While the observed high occurrence of *Brucella* infection in white Fulani breed cows (3.0%) as against Sokoto gudali (0.8%) contrast the

reports of Salihu et al., (2011) which indicated high occurrence in Sokoto gudali (29.5%) and least in white Fulani (6.4%) breeds of cattle. This could be attributed to the geographical distribution and location of Sokoto gudali breed used for breeding purpose in the Sokoto province of North-western Nigeria as against the white Fulani breed that dominate the trade cattle population being transported from the north to the south western Nigeria for human consumption. The detection of higher prevalence of antibody titers by RBPT (3.8%) than MSAT (1.1%) agreed with previous report by Mbuk et al., (2011). This further analysis of sera by MSAT confirms significant *Brucella* antibodies in trade and slaughtered cattle in the study area and by implication endemicity of brucellosis in Nigeria. Therefore, the workers especially women that engage in the trade of collecting blood with unprotected hands are at risk of contacting brucellosis as previously reported (Bale, 1991; Young, 1995 and Corbel, 1997) that *Brucella* organism can gain entry into occupational workers (Cattle men, animal handlers, veterinarians, slaughter house workers) through unprotected breaks in skin, mucous membrane, conjunctiva, respiratory and gastrointestinal tract resulting into human brucellosis (Baba, et al., 1998). The participatory appraisal using oral interview further confirms the possibility of human transmission as most of these women have little or no awareness as regards the possible danger associated with their job. This is also complicated by the fact that majority of the respondents are of the myth that cattle blood is of no harm to humans. Further, discussion reveals the absence of preventive plans or protocol for these workers and attempts to collect blood specimens from these workers for *Brucella* screening yielded no positive efforts. Lastly, they confirmed that blood collected is usually processed into various meals for fish, pigs, dogs, poultry and the human

delicacy popularly called “siki” which supports the high risk of extensive morbidity in humans especially in butchers and slaughter house workers as previously reported (Cadmus et al., 2006). In conclusion, the occurrence of *Brucella abortus* antibodies in slaughtered cattle confirms the endemicity of Brucellosis in the study area and by implication possibility of human transmission especially in women that engage in blood and meat-by product processing in the slaughter house. Personal hygienic measures, periodic screening of all abattoir workers to ascertain their health status (Salihu et al., 2011) and public health education (Mbuk et al., 2011) as previously suggested should be emphasized. In addition to advocacy on creation and promotion of women entrepreneurship in other economic sectors that have minimal occupational health risk factors.

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