# Potential Risk Posed by Meat and Unprocessed Milk in the Transmission of Brucellosis in Kenya

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**Abstract**

*The aim of the study was to determine the potential risk posed by meat and unprocessed milk in the transmission of Brucellosis to humans in Eldoret Municipality. The study was longitudinal using simple random sampling. A total of 1085 milk and 928 serum samples were collected. Brucella milk ring test (MRT) and Rose Bengal Plate Test (RBPT) were performed on the milk and serum samples respectively. Compliment Fixation Test (CFT) was carried out as a confirmatory test at the Central Veterinary Laboratories in Nairobi on all the serum samples. All the bovine samples were negative for Brucellosis on both RBPT and CFT. Five of the 245 samples (2.0%) from goats were positive on CFT. One of the 152 (0.7%) serum samples from ovine was positive for Brucellaabortus antibodies in both RBPT and CFT. Bulking of milk at collection points could have led to high levels of dilution interfering with the sensitivity of the tests. Moi Teaching and Referral Hospital (MTRH) records had 48 out of 41198 (0.1%) patients positive for Brucellamelitensis. Records at the Regional Veterinary Investigation Laboratory (RVIL) in Eldoret showed that Brucellosis accounted for 1% (2001) and 2% (2002) of all cases handled in the laboratory. Brucellosis prevalence in meat (sera) and milk in the study area was negligible consequently; transmission to man through consumption of meat and milk may be negligible. The low prevalence of bovine brucellosis requires constant surveillance in case the prevalence may change.*

**Key Words:** Rose Bengal Plate Test (RBPT), Milk Ring Test (MRT), Compliment Fixation Test (CFT), Brucellosis

## INTRODUCTION

Brucellosis is a zoonotic disease affecting both animals and humans with great economic importance in most countries (Nicoletti, 1984; Mc Dermott *et al.*, 1987). Brucellaabortus, Brucellamelitensis, Brucellasuis and Brucellacanis species infect both animals and humans, while Brucellaovis only infects animals. Brucellosis is one of the commonest public health problems affecting people all over the world (Coulibaly & Yameogo, 2000). It is being considered a re-emerging food-borne disease transmitted through contaminated milk, meat and their respective products (Miller & Paige, 1998).

Human Brucellosis is transmitted through contact with infected animals, their products or materials contaminated with animal discharges associated with abortion (Herdricks & Meyer, 1975; El- Amin *et. al.,* 2001). Lindeman (2002) found that it is also possible that animal faeces or urine may infect raw green vegetables and water. Brucellosis is on the increase in many parts of the country and a public health concern particularly with liberalization of the milk industry (Omore *et al.*, 2002). In Eldoret Municipality, hawking of milk thrives in an unrestricted manner. The aim of this study therefore was to determine the presence and the extent of Brucella infection in meat and unprocessed milk sold to consumers in Eldoret and the potential of the two animal products in the transmission of Brucellosis to humans.

## MATERIALS AND METHODS

### Study Area

Eldoret is a cosmopolitan town at an altitude of 2,085 meters above sea level. The inhabitants of the town constitute a diverse socio-economic status that provides a market for milk and meat sold in the municipality. The population is composed of civil servants, employees in the industries, public institutions and a large student population in universities, colleges and other learning institutions situated within the Eldoret Municipality. Due to the favourable topographical and climatic conditions, the entire district has a high potential for livestock activities and other agricultural enterprises.

### Materials and Analysis

The study was a longitudinal survey using simple random sampling of unprocessed milk collected from the pooling centers located along roads leading to the town. At the pooling centers, the available milk cans were selected randomly and sampled into a sterile test tube after thorough mixing. The milk sample was placed in a cool box for preservation and transportation to the laboratory for analysis. Serum samples were collected using a vacutainer before the animals were stunned for slaughter. Fifteen cattle were selected randomly and sampled out of the 40 slaughtered per day. Similarly, ten sheep and goats were sampled from the 30 on slaughter per day.

Laboratory analysis was done using Rose Bengal Plate Test and Milk Ring Test. Compliment Fixation Test was used as a confirmatory test on all samples. All positive Brucellosis cases at Moi Teaching and Referral Hospital (MTRH) were recorded during the study period to serve as an indicator of itscontribution to the disease burden at the hospital. The data was analysed and interpreted using descriptive statistics. Authority was obtained from the Institutional Research and Ethics Committee (IREC), the District Veterinary Officer (D.V.O) Eldoret, the Director of MTRH, the Senior Veterinary Investigation Officer, and the Eldoret Municipality. Records were accessed at Regional Veterinary Investigation Laboratory (RVIL) to obtain monthly numbers of cases diagnosed. The samples also formed part of the normal veterinary extension services provided to the study communities in Kenya.

## RESULTS

The prevalence of *Brucellaabortus* in sheep was 0.7%, (one sample out of the 152 collected) while that of *Brucellamelitensis* in goats stood at 2.0 % (5 cases positive out of the 245 samples). All the bovine serum samples were negative for Brucellosis on both Rose Bengal Plate Test and Compliment Fixation Test (Table 1).

Table 1. Summary of results of RBPT and CFT tests on the sera samples

| Animal Species | No of Samples | RBPT +VE | CFT +VE |
|---|---|---|---|
| Bovine (Cattle) | 531 | 0 (0%) | 0 (0%) |
| Caprine (Goats) | 245 | 0 (0%) | 5 (2.0%) |
| Ovine (Sheep) | 152 | 1 (0.7%) | 1 (0.7%) |
| Total | 928 | 1 (0.7%) | 6 (2.7%) |

During the study period from December 2002 to February 2003, 73 patients out of the 41,198 attended to at MTRH tested positive for Brucella infection (Table 2). Forty eight (0.1%) of these were positive for Brucellaabortus and 25 (0.06%) were positive for Brucellamelitensis. During the whole year (2002), 174,678 patients were attended to at MTRH of which 242 tested positive for Brucellaabortus giving 0.1% prevalence while 132 (0.1%) were positive for Brucellamelitensis.

Table 2. Brucella positive cases from MTRH Archives

| Month | Total Number of Patients | No of +veBrucellaabortus | No of +veBrucellamelitensis | Total number of +ve Brucellosis |
|---|---|---|---|---|
| Dec 2002 | 11332 | 22 (0.2%) | 12 (0.1%) | 34 (0.3%) |
| Jan 2003 | 15076 | 11 (0.1%) | 10(0.1%) | 21 (0.2%) |
| Feb 2003 | 14790 | 15 (0.1%) | 3 (0.0%) | 18 (0.1%) |
| Totals | 41198 | 48 (0.4%) | 25 (0.2%) | 73 (0.6%) |
| Jan – Dec 2002 | 174678 | 242 (0.1%) | 132 (0.1%) | 374 (0.2%) |

The results from the Regional Veterinary Investigation Laboratory in Eldoret, (Table 3) show variations in the number of positive Brucellosis specimens.

Table 3. Confirmed Brucella against other disease conditions at V.I.L Eldoret

| Year | 2001 | 2002 |
|---|---|---|
| Total No of Specimen | 795 | 799 |
| Brucellosis Positive Cases | 7 | 12 |
| Percent Positive Brucellosis | 1% | 2% |

## DISCUSSIONS

The results of this study suggest minimal risk of Brucellosis to the general population from meat and unprocessed milk sold in Eldoret Municipality. All the 1085 samples of milk were negative for brucellosis on the milk ring test. These findings are in agreement with the findings of (Namanda*et. al*., 2009), who found no antibody to brucella in 130 unpasteurized milk samples collected from Eldoret Municipality. It also corroborates with the findings of (Omore*et. al*., 2002) who detected no Brucella antibodies in raw milk sold in urban areas in Kenya.These results closely agree with those of Karimuribo*et*

*al* (2007) who found a sero-prevalence of brucellosis in indigenous cattle ranging from 0.6% to 3.6% in Iringa and Tanga in Tanzania.

The results are also in close agreement with those of (Kangethe*et al.,* 2007) who analyzed 393 milk samples from dairy farming and non-dairy farming households. His findings indicated a prevalence of 1% for the dairy farming households and 0.7% for the non dairy farming households. The findings are also similar to those of(Muhammad*et al.*,2011) who screened a total of 200 milk samples from cattle (n=86) and buffalo (n=114) using MRT and i-ELISA. The overall prevalence was found to be 3% and 8.5% in cattle and buffalos using MRT and i-ELISA respectively. The prevalence was 4.6% and 1.7% in cattle and buffalo using MRT, respectively while i-ELISA exhibited 20% and 0% in cattle and buffalo, respectively.

The findings are further strengthened by another research by (Muhammad*et al*., 2012) whereby a total of 780 animals cattle (n=405 and buffalo (n=375) serum samples were collected from an abattoir in Quetta, Balochistan and evaluated for antibrucella antibodies, using Rose Bengal Plate Test (RBPT) and indirect- enzyme linked immunosorbent assay (i-ELISA) respectively. The overall prevalence of 3% and 3.20% was recorded through RBPT and i-ELISA respectively. In samples collected from cattle (n=405) the seroprevalence was 3.95% and 5.9% while buffalos (n=375) had a seroprevalence of 2.1% and 0.265% using RBPT and i-ELISA respectively.

In Eldoret Municipality and Kenya in general, beef is cheaper than mutton and goat meat. Sheep/Goat meat is considered a delicacy and hence is more expensive than beef. Consequently, it is not readily affordable to majority of consumers. Therefore those in society who fall within this socioeconomic group that can afford goat meat stand a higher risk of contracting the disease as evidenced by the study. However these patients are the minority and would probably seek health services in private institutions and thus their statistic was not captured at MTRH.

## CONCLUSIONS AND RECOMMENDATIONS

Brucellosis incidence in meat (sera) and milk in the study area was negligible; consequently, transmission to man through consumption of meat and milk may be equally negligible. The low prevalence of bovine brucellosis requires constant surveillance in case the prevalence rates may change. Screening of all goats before slaughter was deemed a necessity to protect the consumers and slaughterhouse attendants. On-farm screening for Brucellosis in milk animals should be made a routine procedure in an effort to prevent transmission through meat or milk. Confirmatory laboratory tests should be done in both humans and animals to minimize the number of false negatives.

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