

Brucellosis among animals and human contacts in eastern Sudan

El-Hassan H. El-Ansary, MBBS, Babiker A. Mohammed, MBBS, DCP, Abdul-Rahman. A. Hamad, MSc, Bsc, Abul-Gasim O. Karom, MBBS, Msc.

ABSTRACT

Objectives: To study the relative frequency of brucellosis among domestic animals in Kassala State, Sudan, in the year 1999 and compare the results of previous studies since 1908. Also to study the frequency rates of the disease in animal contacts in the area.

Methods: Sero-survey for *Brucella melitensis* and *Brucella abortus* was carried out on sera of animals brought for slaughter to Kassala abattoir and on sera of occupational contacts of animals. All sera were tested by the slide agglutination test. The positive reactors were confirmed by tube agglutination test.

Results: A total of 1225 sera were tested - 1038 were animal sera and 187 were human sera. Four percent of goats sera, 1% of sheep sera and 5% of cattle sera were found to be positive. Of the 64 camel sera tested, none

were positive reactors. Of the occupational contacts, which included butchers, slaughterhouse workers, milkers and cow attendants, (1%) reacted positively.

Conclusion: The study showed low frequency rates of brucellosis among animals in the Kassala area compared with other parts of Sudan. Occupational contacts showed very low frequency rates of the disease. This is often over-looked by medical practitioners due to the overwhelming problem of malaria in the area. We draw the attention of practitioners to think of brucellosis in the differential diagnosis of fever especially in rural communities.

Keywords: Brucellosis, animal contact, prevalence.

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Human brucellosis was reported in Sudan as early as 1908.¹ In 1950, Simpson² reported one case from Kassala province among other cases from the Blue Nile province. In a review of the Sudan Medical Records between 1928 and 1937, Dafalla reported 102 cases in the Kassala area out of 313 cases from other parts of Sudan.³ Previous animal studies showed that the prevalence of the disease in cattle, sheep, goats and camels in Kassala province was comparable to that from other parts of Sudan.⁴⁻⁶ The area of the former Kassala province was recently reduced to 20% to become Kassala state, with a livestock population of 3,260,621 which included goats, sheep, cattle and camels.⁷ Kassala state borders

Eritrea and Ethiopia. People and animals move freely across the international borders and between neighboring states of Gedaref and The Red Sea. This state of affairs has lead to free contact of herds in grazing land with subsequent effects of transmission of disease to both humans and animals in the area. The prevalence of disease in humans does not parallel the disease in animals, in spite of the fact that 70% of the state population lead a semi-nomadic life and consumed raw milk, while the urban population consume products of raw milk in the form of yogurt and cheese. This prompted us to consider restudying the disease in animals and their human contacts in Kassala state.

From the Faculty of Medicine and Health Services (Ansary, Mohammed, Karom), University of Kassala, and the Livestock Administration, (Hamad), Ministry of Agriculture and Animal Resources and Irrigation, Kassala State, Sudan.

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Address correspondence and reprint request to: Dr. E. H. El Ansary, Faculty of Medicine and Health Services, Kassala University, Kassala State, Sudan. Tel. +249 411 22890/22514. Fax. +249 411 22323.

Table 1 - Animal reactivity to brucella antigen.

Animal	Number tested	Positive reactors to <i>Brucella melitensis</i>	Positive reactors to <i>Brucella abortus</i>
		n (%)	n (%)
Goats	325	13 (4)	13 (4)
Sheep	351	5 (1)	5 (1)
Cattle	298	16 (5)	16 (5)
Camels	64	0 (0)	0 (0)
Total	1038	34 (3)	34 (3)

Methods. Five ml. of venous blood was collected from each of the 325 goats, 351 sheep and 298 cattle (of the Zebu type African stock), brought for slaughter to Kassala abattoir. Specimens were taken from 64 camels selected at random from 5 herds of a total population of 1000 camels. Blood was also taken from 187 human volunteers, which included slaughterhouse workers, veterinary staff, butchers, herd attendants and cow milkers. Each blood sample was allowed to clot and serum was separated by centrifugation at a speed of 3000 r/m. All sera samples were screened for brucella antibodies by the slide agglutination test using stained bacterial antigen from Omega laboratories, Scotland, U.K. (batch number 8025A). The test result was compared with positive and negative controls, supplied by the same laboratory. Positive reactions were confirmed by tube agglutination test (using double dilution method as described in the Medical Laboratory Manual for Tropical Countries).⁸

Results. In this study the positive reactor rate in goats, sheep and cattle did not differ a great deal from previous studies conducted in different parts of Sudan.^{4,6} As regards to brucellosis in camels, our study did not show a single positive reaction out of 64 specimens, while Mustafa and Awad Al-Kareem⁹ reported prevalence rates of 2% and 6% in the 2 districts of the former Kassala province. It is difficult to explain such a result in the absence of regular vaccination or control programs, furthermore, the small sample size may have affected our results. Tables 1 and 2 show the reactivity rates to brucella abortus and brucella melitensis antigens among animal groups and human volunteers of occupational contact with animals.

Discussion. In clinical practice throughout Sudan, brucellosis does not rank highly in the differential diagnosis of fever in man amongst

medical practitioners, inspite of the reputation of the disease within the veterinary community. The experience of one of the authors of this paper, with more than 25 years practice as a physician in the area, is that human brucellosis is not a major public health problem (El-Ansary). The records of provincial and peripheral hospitals in Kassala state also proved this view.¹⁰ In a literature review of human brucellosis, El-Din and Gameel⁴ showed that Professor Hasseb first reported human brucellosis in 1950 in Northern Sudan.¹ Simpson² in 1950 reported 20 cases from Kassala province among other cases from the Blue Nile province. Since then sporadic cases of brucellosis were being reported from almost every province in the Sudan.^{4,6} The first epidemiological survey of human brucellosis amongst volunteers was conducted in the years 1977 to 1978. Of the 298 participants, 15% were positive reactors.¹¹ We do not know of any other clinical study or epidemiological survey of human brucellosis in the Kassala area following that report. Our study, which targeted individuals in contact with animals or animal products and carcasses, has shown low rates of positive reactors to brucella antigen in the butchers group (2%). None of the veterinary staff, abattoir workers or herd attendants reacted positively. In view of the common practice of drinking raw milk by all rural inhabitants, one would expect a high reactor rate in this group. Butchers commonly eat raw meat (liver and kidneys), so one would also expect a higher rate in this group, but it is difficult to explain the absence of positive reactors among veterinary staff and abattoir workers who are continuously exposed to gestational products, specially in cases of abortion. The fact may be that amongst this particular group there is a higher general awareness about the disease and most of the workers are more cautious when confronted with a diseased animal. Brucellosis is a febrile illness, but sub-clinical

Table 2 - Human reactivity to brucella antigen.

Human	Number tested	Positive reactors to <i>Brucella melitensis</i>	Positive reactors to <i>Brucella abortus</i>
		n (%)	n (%)
Butchers	85	2 (2)	2 (2)
Abattoir workers	42	0 (0)	0 (0)
Veterinary staff	33	0 (0)	0 (0)
Herd attendant & milkers	27	0 (0)	0 (0)
Total	187	2 (1)	2 (1)

infection is common.¹² In areas where malaria is a holo-endemic disease such as the Kassala area, most patients with a febrile illness would report to the physician after they have had several courses of antimalarial and or antibiotic treatment. All these factors together with the self-limiting nature of brucellosis may obscure the true incidence of the disease in the community.

In conclusion, this study has shown an overall reactivity rate of brucellosis in animals that is comparable to or lower than that shown in previous studies. This situation in animals is not reflected in an increase in clinical disease in the community, but we think that the occasional case of human brucellosis is often misdiagnosed as a case of drug resistant malaria. During the few months of this study, however, we have diagnosed at least 5 cases of acute brucellosis which were being treated as multi-drug resistant malaria. We would like to draw the attention of young doctors to the fact that brucellosis is prevalent in the community and that in every febrile patient the possibility of brucellosis should be considered in the differential diagnosis. In this environment, it is common sense to think of malaria in a febrile patient, but to insist that every febrile illness is malaria is mal-sense.

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