

Assessment of Practices Enhancing the Prevalence of Brucellosis Among Rural Women Farmers in Kwara State, Nigeria

Mobolaji Musa

Faculty of Agriculture, University of Ilorin, Nigeria.

E-mail: musa.mo@unilorin.edu.ng

Abstract. Improvement in practices among farmers could play a major role in the reduction of brucellosis among farmers in the farming areas. The study aimed at assessing the practices enhancing the prevalence of brucellosis among rural women farmers in Kwara state, Nigeria. Three hundred women farmers were interviewed using a questionnaire with questions about socio-economic characteristics, living conditions of the respondents and their animals, level of awareness about brucellosis and practices they engaged in. Descriptive statistics, chi square and Pearson Product Moment Correlation were used to analyze data collected. About 72.0% of the respondents were aware of brucellosis. The study also revealed that 71.0% identified consumption of raw cow milk as a practice enhancing brucellosis transmission, 71.3% consumed raw cattle milk, majority consumed raw cattle meat products, 65.3% had contacts with infected people, 72.0% also had contact with infected cattle, 66.7% dumped of aborted cattle on the street and 72.0% treated sick cattle at home. Conclusively, Consumption of raw cow milk, consumption of raw cattle milk, consumption of raw cattle meat products, contact with infected people, contact with infected cattle, dumping of aborted cattle on the street and treating sick cattle at home were identified to be practices engaged in by the women farmers that enhanced the prevalence of brucellosis transmission. There is need for training programmes on preventive practices especially the rural women who have closest proximity to livestock in order to prevent human and animal morbidity and reduce the burden of brucellosis.

Keywords. Assessment, Brucellosis, Practices, Transmission, Prevalence.

1. Introduction

Brucellosis is considered by the Food and Agriculture Organisation (FAO), the World Health Organisation (WHO) and the Office International des Epizooties (OIE) as one of the most widespread zoonoses in the world [1]. According to Regea [2], brucellosis is a zoonotic disease transmitted directly or indirectly by exposure to infected animals. Brucellosis remains a neglected zoonosis of low-income nations although it has been eradicated in many developed countries after years of effort [3]. According to [4], it is the second most important zoonotic disease in the world. Brucellosis is a bacterial infectious disease caused by *Brucella* spp, with *B. abortus* primarily affecting cattle. According to [5], *Brucella abortus*, *B. melitensis* and *B. suis* are the species that affect human health majorly. The disease is widespread in many low-income countries and although with low mortality rate in humans, infection might develop into a disabling chronic illness [6].

In Nigeria where livestock management is still largely systematic, bovine brucellosis is endemic and about 60% of the human population show serological evidence of *Brucella abortus* infection. The

economic loss to the livestock industry due to brucellosis if estimated would probably run into millions annually, judging from the high rate of abortion among pregnant cattle in some farms [7]. The public health consequences are also enormous, considering the fact that protein under-nutrition is very common in Nigeria and complete eradication of bovine brucellosis is not feasible in Nigeria at present due to negligence. However, reasonable control measures, based on the existing social and health systems in the country are possible. Immediate interim control measures include hygiene on farms and abattoirs, avoidance of raw milk, and vaccination of cattle in settled herds and people specially exposed to risk of infection [8].

According to [9], among all the livestock that makes up the farm animals in Nigeria, ruminants, comprising sheep, goats and cattle, constitute the farm animals largely reared by farm families in the country's agricultural system. Nigeria has a population of 34.5 million goats, 22.1 million sheep and 13.9million cattle. Nigeria, India, Ethiopia, and Bangladesh account for 44% of poor livestock keepers globally, Nigeria ranks second [10]. According to ILRI (2012), livestock production has always been important in Nigeria, and the rapidly emerging livestock sector now ranks second among the 20 poorest countries and approximately 70% of the population live in rural areas, but there is now considerable rural-urban drift. Small ruminant production is associated with high levels of human contact, resulting in a high risk of zoonotic disease transmission. Cattle are mainly reared in intensive or semi-intensive dairy farms, with only small numbers kept as household animals [11].

The occurrence of brucellosis is much higher among women farmers who have the closest proximity to livestock and this creates a need to assess the practices in order to prevent both human and animal morbidity, reduce the burden of zoonotic agents as animal reservoir, avoid potential economic disorders created by trade, epidemics in rural communities in turn have impacts on urban food securities and safety. Despite the endemic nature of these zoonotic diseases and their effect on rural women, little or no rigorous research exists on these subjects of interest, particularly in Kwara State.

Brucellosis places pregnant women and their babies at risk and women with brucellosis are twice as likely to give birth to a premature or low birth weight babies and four times more likely to die in childbirth [12]. Furthermore, brucellosis progresses more quickly in women of reproductive age than men of the same age group. Women with brucellosis are often too ill to engage in farm work leading to decrease in their productivity and a resultant reduction in income. Infertility in women has been attributed to many factors other than brucellosis infection. This zoonotic disease has been found to engender infertility in women who are habitually in contact with infected animals. They have negative impact on sexual health, leading to dispareunia and sexual dysfunction, and can result to infertility [13].

The main objective of the study was to assess the practices enhancing the prevalence of brucellosis among rural women farmers in Kwara state, Nigeria while the specific objectives were to:

- Describe the socio-economic characteristics of the rural women farmers;
- Describe the living conditions of the rural women farmers and their animals;
- Determine the level of awareness about brucellosis among rural women farmers; and
- Assess the practices that enhanced brucellosis transmission among the rural women farmers.

2. Materials and Methods

The study was conducted in Kwara state, Nigeria. Kwara State was created on the 27th of May, 1967 along with 11 other states of the federation. The state was originally called west central state, having been carved out of the defunct northern Nigeria. At the time of creation, the state had a landmass of 60.380 Km² but this has reduced to 34,804.72 Km² following the boundary adjustments that accompanied excision of a segment of its eastern part to Benue State in 1976 and 6 local government areas to the present Kogi and Niger States in 1991. However, recent survey shows that the state has a total land area of about 3, 2500 km² which is about 3.5% of the total land area of the country (923,768 km²).

The target respondents for this study were the rural women farmers at the selected local government areas of Kwara state, Nigeria. A multi-stage sampling technique was adopted in the selection of sample for this study. The study was carried out in five communities which were selected purposively due to the prominence of brucellosis in the areas. These villages are Gaa wara, Bolorunduro, Alhaji

Abdulkadri, Tukasi and Aladii. Fifty women farmers were selected from each of the communities making a total of three hundred (300) women farmers. Well-structured questionnaire were administered to women who had contacts with cattle or their products. The collected data was compiled, tabulated and analyzed in accordance with the objectives of the study.

The approximate percentage was calculated for each parameter. The questionnaire-based data was processed in Microsoft Excel and analyzed in SPSS. The Pearson Product Moment Correlation for proportions was done to examine the relationship between some selected socio-economic characteristics and practices enhancing prevalence of brucellosis among the women farmers.

3. Results and Discussion

Table 1. Socio-Economic Characteristics of the Respondents.

Socio-Economic characteristics	Frequency (n=300)	Percentage (%)
Age		
<15	9	3.0
16-30	130	43.3
31-45	78	26.0
>45	83	27.7
Marital status		
Single	-	-
Married	244	81.3
Divorced	10	3.3
Separated	2	0.7
Widowed	44	14.7
Level of Education		
No formal education	280	93.3
Primary education	8	2.7
Secondary education	-	-
Tertiary education	-	-
Quranic education	12	4.0
Religion		
Christianity	-	-
Islam	300	100
Traditional	-	-
Other (specify)	-	-
Secondary occupation		
Milking of cattle	120	40.0
Making of cheese	163	54.3
Other (specify)	17	5.7
Household size		
1-5	80	26.7
6-10	190	63.3
11-15	20	6.7
>15	10	3.3

Of the total of 300 respondents involved in this study, 43.3% fell within the age range of 16-30, 81.3% were married, 93.3% had no formal education, 54.3% were involved in the making of cheese while 63.3% had a household size of 6-10. This shows that almost half of the respondents are within the age of 16-30, married and almost all of them had no formal education.

Table 2: Living Conditions of Respondents and Their Animals.

Living conditions	Frequency (n=300)	Percentage (%)
Type of house		
Mud	54	18.0
Concrete	22	7.3
Straws	224	74.7
Other (specify)	-	-

Living conditions	Frequency (n=300)	Percentage (%)
Roof type		
Straws	280	93.3
Grasses	4	1.3
Iron sheets	16	5.3
Floor type		
Cemented	152	50.7
Uncemented	148	49.3
Sleeping rooms		
1	72	24.0
2	206	68.7
3	18	6.0
4	4	1.3
Above 4	-	-
Average number in a room		
1	10	3.3
2	44	14.7
3	78	26.0
4	70	23.3
Above 4	98	32.7
Housing system		
Intensive	-	-
Semi intensive	66	22.0
Extensive	234	78.0
Animal floor type		
Cemented	2	0.7
Uncemented	298	99.3
Animal feed		
Roughages	300	100.0
Concentrates	-	-

Table 2 shows the living conditions of respondents and their animals. 74.4% of those that lived in straw houses, 68.7% have two sleeping rooms with 32.7% having an average of more than four people sleeping in a room. 78.0% of the cattle are kept under the extensive housing system and 100.0% feeding on roughages. This reveals that more than half of the rural women live in straw houses and have two sleeping rooms with about half having an average of more than four people sleeping in a room.

Table 3. Level of Awareness of Brucellosis among Rural Women Farmers.

Level of awareness	Frequency (n=300)	Percentage (%)
Are you aware of brucellosis		
Yes	216	72.0
No	84	28.0
Since when have you been aware (in months)		
Not aware	84	28.0
0-24	37	12.3
25-48	15	5.0
49-72	164	54.7
Above 72	-	-
Source of awareness		
Extension agents	-	-
Trainings	9	3.0
Hospital	88	29.3
Not aware	84	28.0
Family and friends	119	39.7

Table 3 shows that 72.0% of the respondents were aware of brucellosis, this finding is similar that of a study in Uganda which showed a high awareness of brucellosis among the community participants

[14], and 54.7% of the women have been aware for 49-72 months while 39.9% got to know about brucellosis from family and friends. This shows that there is a high level of awareness of brucellosis and they have been aware for several months.

Table 4. Practices Enhancing Prevalence of Brucellosis.

Variables	Frequency (n=300)	Percentage (%)
Consumption of raw cow milk		
Yes	213	71.0
No	87	29.0
Consumption of raw cattle meat		
Yes	214	71.3
No	86	26.7
Consumption of raw cattle meat products		
Yes	216	72.0
No	84	28.0
Contact with infected people		
Yes	196	65.3
No	104	34.7
Contact with infected cattle		
Yes	216	72.0
No	84	28.0
Dumping of aborted animal on the street		
Yes	200	66.7
No	100	33.3
Treating sick cattle at home		
Yes	216	72.0
No	84	28.0

As shown in table 4, 71.0% of the respondents indicated that consumption of raw cow milk was a practice they engaged in, 71.3% chose consumption of raw cattle meat. 72.0% said they consumed raw cattle meat products, 65.3% picked contact with infected people contact, 72.2% agreed with contact with infected cattle, 66.7% said they engaged in dumping of aborted animals on the street and 72.0% of the respondents agreed with treating of sick animals at home. This result is supported by earlier findings that revealed the consumption of unpasteurised milk and milk products amongst Fulani pastoralists who drink milk directly from the udders of cows [15], which also imply that consumption of raw cow milk enhance the prevalence of the zoonotic disease. Also, previous reports by [16], and reported that approximately 90.0% of milk consumed in sub-Sahara Africa is raw or soured. Selato [17], also opined that the habit of eating uncooked meat from various animals is common amongst Africans and this has resulted in the occurrence of different zoonotic infections amongst humans. The findings of [18], which stated that more than 50% believed that contact with infected people is a moderate risk of brucellosis infection supported the findings of this study that most of the respondents had contacts with infected cattle.

Table 5. Analysis to examine the relationship between some selected socio-economic characteristics and practices enhancing prevalence of brucellosis.

Variables	r value	p value	Significance
Age	-0.036	0.473	Not significant
Secondary occupation	0.351*	0.004	Significant
Education	0.242	0.372	Not significant
Household size	0.125**	0.038	Significant

Field Survey, 2014.

*Correlation is significant at the 0.01 level (2-tailed), **Correlation is significant at the 0.05 level (2-tailed)

The correlation between some socio-economic characteristics of the respondents and the practices that enhance brucellosis shows that secondary occupation ($r=0.351$) and household size ($r=0.125$) had significant relationships with practices enhancing the prevalence of brucellosis. This shows that

secondary education and household size affected the practices the respondents engaged in while age ($r = -0.036$) and education ($r = 0.242$) were not significant on the practices as shown in table 5.

Conclusion and Recommendation

The study assessed practices which enhanced the prevalence of brucellosis among women farmers in Kwara State. Consumption of raw cow milk, consumption of raw cattle milk, consumption of raw cattle meat products, contact with infected people, contact with infected cattle, dumping of aborted cattle on the street and treating sick cattle at home were the identified practices engaged in by the women farmers that enhanced prevalence of brucellosis transmission.

Therefore, the study recommends training programmes on preventive practices especially the rural women who have closest proximity to livestock in order to prevent human and animal morbidity, reduce the burden of brucellosis as reservoir, avoid potential economic disorders created by trade which in turn have impacts on urban food securities and safety. Also, there is need for more awareness about brucellosis among the women farmers. The women farmers should also be enlightened on the type of secondary occupation they should engage in and the risks involved in those occupations.

References

- [1] Alizadeh, H., Dezfulian, M., Rahnema, M., Fallah, J., and Esmaili, D. (2019). Protection of BALB/c Mice against Pathogenic *Brucella abortus* and *Brucella melitensis* by Vaccination with Recombinant Omp16. *Iran J Basic Med Sci.* 22(11):1302–1307.
- [2] Regea, G. (2017): Brucellosis and its Control through One Health Approaches in Ethiopia. *Jou. Vet. Med. Res.* 4(3): 108
- [3] Olsen, S.C., and Palmer, M.V. (2014). Advancement of Knowledge of *Brucella* over the past 50 years. *Vet Pathol.*, 51(6):1076–89.
- [4] Bulcha, B., and Etefa M. (2023). Assessment of Farmers' Knowledge, Attitudes and Practices toward Brucellosis in Sibu Sire District, East Wallaga Zone of Western Oromiya, Ethiopia. *Int J Vet Sci Res* 9(3): 070-079. DOI:<https://dx.doi.org/10.17352/ijvsr.000140>
- [5] Franc, K.A., Krecek, C.R., Hasler N.B., and Arenas-Gamboia M.A (2018). Brucellosis remains a Neglected Disease in the Developing World: A Call for Interdisciplinary Action. *BMC Public Health*, 18:125. doi: [10.1186/s12889-017-5016-y](https://doi.org/10.1186/s12889-017-5016-y)
- [6] World Health Organization (2016). World Health Statistics 2016: Monitoring Health for the SDGs
- [7] Asakura, S., Makingi, G., Kazwala, R., and Makita, K. (2018). Brucellosis Risk in Urban and Agro-pastoral Areas in Tanzania. *EcoHealth.* 2018;15(1):41–51. doi: [10.1007/s10393-017-1308-z](https://doi.org/10.1007/s10393-017-1308-z)
- [8] Zamri-Saad, M., and Kamarudin, M.I. (2016). Control of Animal Brucellosis: The Malaysian experience. *Asian Pac J Trop Med.*, 9(12):1136-40
- [9] Yusuf, A., Aruwayo, A., and Muhummad, I.R. (2018). Characterisation of Small Ruminant Production Systems in Semi-arid Urban areas of Northern Nigeria. *J Appl Sci Environ Manage.* 22:725–9. doi: [10.4314/jasem.v22i5.18](https://doi.org/10.4314/jasem.v22i5.18)
- [10] Bellet, C., and Rushton, J. (2019). World Food Security, Globalisation and Animal Farming: Unlocking Dominant Paradigms of Animal Health Science. *Rev Sci Tech.* 38:383–93. [10.20506/rst.38.2.2993](https://doi.org/10.20506/rst.38.2.2993)
- [11] FAO-Food and Agriculture Organization of the United Nations (2016). The state of food and agriculture: Livestock in the balance. FAO, Rome, Italy
- [12] Alsaif, M., Dabelah, K., Featherstone, R., and Robinson, J.L. (2018). Consequences of Brucellosis Infection during Pregnancy: A Systematic Review of the Literature. *International journal of Infectious Diseases*, 73: 18-26 DOI:<https://doi.org/10.1016/j.ijid.2018.05.023>
- [13] Starc, A., Jukić, T., Poljšak, B., and Dahmane, R. (2018). Female Sexual Function and Dysfunction: A Cross-national Prevalence Study in Slovenia. *Acta Clin Croat.* 57:52–60. [10.20471/acc.2018.57.01.06](https://doi.org/10.20471/acc.2018.57.01.06)
- [14] Majalija, S., Luyombo, P. and Tumwine, G. (2018). Sero-prevalence and Associated Risk Factors of Brucellosis among Malaria Negative Febrile Out-patients in Wakiso district, Central Uganda. *BMC Res Notes* 11, 803. <https://doi.org/10.1186/s13104-018-3907-3>
- [15] Anya, M.I., and Ozung, P.O. (2018). Composition and Quality of Fresh Cow Milk offered for sale in Obudu Grass Plateau, Cross River State – Nigeria. *Nigerian J. Anim. Sci.*, 20 (3): 295-303
- [16] FAO-Food and Agriculture Organization of the United Nations (2022). Economic Analysis of Food Supply and Demand in Sub-saharan Africa up to 2022
- [17] Selato, M.T. (2024). "Evaluation of Community Knowledge, Attitudes, and Practices Regarding Meat and Dairy Borne Zoonotic Diseases in Arbaminch Town, Gamo Zone, Southern Ethiopia". *Acta Scientific Veterinary Sciences*, 6.2: 36-44

- [18] Imadidden I. M, Mahmoud N.A and Javier G. (2015). Knowledge, Attitudes, and Practices associated with Brucellosis in Livestock Owners in Jordan. *Am J Trop Med Hyg.* 2015 Dec 9; 93(6): 1148–1155.
[doi: 10.4269/ajtmh.15-0294](https://doi.org/10.4269/ajtmh.15-0294)