

RISK FACTORS ASSOCIATED WITH BRUCELLOSIS SEROPREVALENCE AMONG ABATTOIR WORKERS IN BAUCHI STATE, NIGERIA

¹Saidu Isah, ²Musa Auwalu

¹Department of Environmental Health Science, Faculty of Allied Health Sciences, Federal University of Health Sciences, Azare, Bauchi State, Nigeria

²Ministry of Livestock Development, Bauchi State, Nigeria

*Corresponding Author Email Address: saiduisah557@gmail.com, saidu.isah@fuhsa.edu.ng

ABSTRACT

Brucellosis is a zoonotic disease that affects a wide range of domestic and wild animals, and human beings globally. The disease is contracted through direct contact with infected animals, consumption of unpasteurized dairy products, or inhalation of contaminated aerosols. Workers in the meat processing chain are more vulnerable to the disease. This study assessed the associated risk factors for the prevalence of Brucellosis among abattoir workers in Bauchi State. The factors examined were age, years of experience, contact with animals' blood or fluids, and consumption of unpasteurized milk. An Ex post facto research design was employed. Researcher-developed questionnaire forms were administered to 224 abattoir workers who were selected using a multi-stage sampling procedure in the state. Binary logistic regression and omnibus Wald chi-square were used to test the postulated hypothesis at the 0.05 level of significance. The finding revealed that the calculated Chi-square (χ^2) value is 21.61, which is greater than the critical value. This shows that the four predictors combined are significant risk factors for the prevalence of Brucellosis among abattoir workers in Bauchi State. It was concluded that age and consumption of unpasteurized milk are significant risk factors associated with the prevalence of brucellosis among abattoir workers in Bauchi State. In view of this, the study recommends that public health authorities should intensify education on the dangers of consuming unpasteurized milk and promote safe handling practices of animals and animal products among abattoir workers in Bauchi State.

Keywords: Prevalence, Associated risk factors, Brucellosis, Abattoir workers, Bauchi

INTRODUCTION

Brucellosis is a zoonotic disease that affects a wide range of domestic and wild animals globally. The disease is caused by bacteria of the genus *Brucella*, which are non-motile, Gram-negative, facultative intracellular *coccobacilli* (Hayoun et al., 2023). The genus *Brucella* has *B. abortus*, *B. melitensis*, and *B. suis* as the primary species responsible for infections in livestock and humans (Corbel, 2006). It is usually transmitted through direct contact with infected animals, consumption of unpasteurized dairy products, or inhalation of contaminated aerosols (Gwida et al., 2021). The four *Brucella* species that are of primary concern to human health are *Brucella melitensis* (associated with goats and sheep), *Brucella abortus* (cattle), *Brucella suis* (pigs), and *Brucella canis* (dogs) (Asmare et al., 2020). This is due to the fact that beef, mutton and pork are consumed by humans as food. As such,

understanding the risk factors for brucellosis in both humans and animals is crucial for developing effective prevention and control strategies. Many studies documented that infected animals shed the bacteria in milk, uterine discharges, and aborted materials, which facilitates transmission among animals and humans (Osoro et al., 2015; Salisu et al., 2021). It was also reported that the disease has a high reproductive and economic toll, especially in areas reliant on goat production for livelihood (Asmare et al., 2017).

Globally, a plethora of studies have reported high seroprevalence rates of Brucellosis among occupational groups exposed to livestock. A meta-analysis by Dean et al. (2012) also revealed that brucellosis remains under-diagnosed among exposed workers due to its non-specific clinical symptoms and diagnostic limitations. In another study conducted in Iran by Sofian et al. (2008), it was reported that 70% of human brucellosis cases were associated with occupational exposure; male farmers aged between 25 and 55 years are more susceptible. In addition, a study in Kenya, Osoro et al. (2015), also proved a strong association between animal and human seropositivity in pastoralist communities. Similar patterns of outcome were also observed in Egypt (Holt et al., 2010).

Recent studies in sub-Saharan Africa, including Nigeria, have shown significant seroprevalence. A cross-sectional study by Umaru et al. (2020) in Bauchi State, Nigeria, reported a seroprevalence of 18.5%, linked to poor husbandry, lack of vaccination, and cohabitation with other ruminants (Salisu et al., 2021). The disease is endemic in many developing countries, including Nigeria, where control programmes are often weak and usually underfunded (Adesokan et al., 2016). The transmission primarily occurs through direct contact with infected materials such as fetal membranes, vaginal discharges, and consumption of unpasteurised milk. Another study in Abuja found seroprevalence rates of 5.1% in cattle, 4.5% in goats, and 3.2% in sheep, highlighting the widespread nature of brucellosis among ruminants in Nigeria (Cadmus et al., 2017). A study conducted in Lagos State reported a seroprevalence of 16.3% among livestock slaughtered at the Oko-Oba abattoir, indicating a significant presence of the disease in the region (Ukwueze et al., 2020). Furthermore, studies by Onyeka et al. (2018) conducted in Abia State revealed that occupational exposure is the major risk factor among abattoir personnel. The findings underscore the importance of targeted awareness campaigns and regular screening programmes (Okolo et al., 2019; Nwosu et al., 2020; Eze & Chukwu, 2021; Onyeka et al., 2018).

Recent studies in northern Nigeria reported seroprevalence rates ranging from 5% to 22%, particularly in herds without routine vaccination or biosecurity (Bwala *et al.*, 2020; Junaidu *et al.*, 2019). The disease's silent spread through trade and movement of livestock exacerbates the challenge of eradication (Junaidu *et al.*, 2019). In a study conducted in Kano State, Nigeria, by Kaltungo *et al.* (2015), seroprevalence in cattle was found to be 16.3%, with minimal awareness among herders and abattoir staff. The persistence of brucellosis in ruminants is attributed to factors such as the movement of infected animals, lack of routine screening, and inadequate veterinary services (Kassa *et al.*, 2023). The risk increases with frequent lack of PPE and inadequate slaughterhouse infrastructure (Ameh *et al.*, 2023). In most developing countries, slaughtering is performed manually, increasing the likelihood of skin abrasions and mucosal exposure. Poorly ventilated environments also foster the inhalation of *Brucella*-contaminated aerosols. Studies in Tanzania by Swai and Schoonman (2012) revealed that abattoir workers with more than five years of experience had significantly higher odds of being seropositive than newer workers.

Veterinarians are at high risk due to their direct involvement in animal examinations, surgeries, parturition assistance, and necropsies (Pappas *et al.*, 2006). Despite their knowledge of the disease, many veterinarians fail to adhere to strict biosecurity protocols due to a lack of resources or complacency. In Pakistan, Khan and Zahoor (2018) found that 22% of veterinarians tested positive for anti-*Brucella* antibodies. In Nigeria, Alhaji *et al.* (2016) observed that even veterinary professionals had limited access to PPE and diagnostic tools, increasing their vulnerability. Livestock farmers and nomadic pastoralists are exposed to *Brucella* primarily through animal handling, milking, and contact with aborted fetuses (Ducrotoy *et al.*, 2014). Transhumance and mixed-herding systems increase contact with potentially infected animals across different regions. A study in Uganda by Makita *et al.* (2008) revealed that livestock farmers had higher odds of brucellosis than non-animal handlers. In Nigeria's northern pastoral communities, Yusuf *et al.* (2022) found seroprevalence rates exceeding 20% among Fulani herders. Milk handlers are at risk due to contact with unpasteurized milk from infected animals (Tadesse, 2016). Laboratory-acquired infections (LAIs) with *Brucella* are well-documented. Handling live cultures without biosafety cabinets or improper specimen processing exposes lab workers to infection through aerosols (Traxler *et al.*, 2013). A single exposure incident can lead to outbreaks among lab staff if safety protocols are inadequate.

This habit is associated with oral transmission of *Brucella*, particularly *B. melitensis*, which is known for its virulence in humans (Musa *et al.*, 2022). Infected animals can shed the bacteria through milk, aborted fetuses, or vaginal discharges, contaminating the environment and increasing human contact risks (Kassa *et al.*, 2023). Other factors include low awareness and inadequate training, which limit early recognition and reporting of the disease (Oladimeji *et al.*, 2021), and weak veterinary public health infrastructure, which hampers disease control and surveillance (Olayemi *et al.*, 2020). Environmental factors like overcrowding of animals, poor slaughterhouse hygiene, and lack of carcass disposal systems further amplify the risk of brucellosis among both ruminants and humans (Zubairu *et al.*, 2021). Understanding these risk factors is crucial for designing targeted interventions to reduce transmission and improve occupational and public health

outcomes.

Cross-species infections may also occur, especially in mixed farming systems (Godfroid *et al.*, 2013). Pregnant animals are more susceptible to brucellosis, as the organism demonstrates a marked tropism for the reproductive system (Moreno *et al.*, 2002). This primarily increases animal-to-animal contact and the probability of transmission within the herd (Makita *et al.*, 2008). Additionally, communal grazing, herd mixing, and inadequate quarantine procedures for new animals exacerbate the spread of the infection (Ducrotoy *et al.*, 2014). The absence of vaccination programmes is also another important risk factor (FAO, 2010). In humans, the primary risk factor for brucellosis is occupational exposure, especially among individuals working closely with livestock. These include abattoir workers, veterinarians, butchers, herders, and laboratory personnel (Pappas *et al.*, 2006). Human infection typically occurs through direct contact with infected animal fluids, tissues, or aerosols during parturition, slaughtering, or necropsy. The lack of personal protective equipment (PPE) and poor hygiene practices amplify these occupational risks (Ameh *et al.*, 2023). Unpasteurized dairy products, such as raw milk, cheese, and yoghurt from infected animals, remain a major non-occupational route of human brucellosis (Tadesse, 2016).

Studies have shown that males are more frequently affected than females, likely due to their dominance in high-risk occupations (Sofian *et al.*, 2008). Children are also at risk in pastoral communities (Adamu *et al.*, 2016). Delayed diagnosis and under-reporting of brucellosis are common in regions with limited diagnostic capacity (Osoro *et al.*, 2015). In rural Nigeria, for instance, awareness of brucellosis among livestock handlers remains low, which correlates with high human seroprevalence (Yusuf *et al.*, 2022). Veterinary services often operate independently of human health systems, leading to data silos and missed opportunities for joint response (Dean *et al.*, 2012). Inappropriate treatment of brucellosis in animals can result in asymptomatic carriers that remain infectious, perpetuating the zoonotic cycle (Gwida *et al.*, 2010).

One major risk factor is occupational exposure, particularly among those who regularly handle animal tissues, blood, and reproductive fluids without adequate protective gear (Igawe *et al.*, 2020). A study conducted in northern Nigeria revealed that poor use of gloves and aprons during the slaughtering process significantly increased infection risk (Raji *et al.*, 2019). Another study by Cadmus *et al.* (2008) in southwestern Nigeria showed that 14% of abattoir workers were seropositive; Saidu *et al.* (2023) documented seroprevalence rates as high as 18.2% among abattoir workers in Bauchi State, with the highest exposure observed in butchers and meat handlers who directly processed carcasses without protective clothing. It is in view of this backdrop that this study is designed with a view to assessing the associated risk factors for the prevalence of Brucellosis among abattoir workers in Bauchi.

MATERIALS AND METHODS

Research Objective

To determine the risk factors associated with Brucellosis seroprevalence among abattoir workers in Bauchi State, Nigeria

Research Question

What are the risk factors associated with the seroprevalence of Brucellosis among abattoir workers in Bauchi State, Nigeria?

Research Hypothesis

H01: Associated risk factors for the seroprevalence of Brucellosis among abattoir workers in Bauchi State, Nigeria will not be significant.

Research Design

The study adopted a retrospective study design using records obtained from abattoir workers to investigate the risk factors for the prevalence of Brucellosis among abattoir workers in the state. The design analyses existing data such as medical records, history and other related indices to investigate past events.

Population of the Study

The target population comprised all registered abattoir personnel working in the registered abattoirs in Bauchi State, including veterinarians, environmental health officers, public health officers, butchers, meat handlers, and cleaners. According to records from the Bauchi State Ministry of Livestock Development (2025), the total population was 550 workers.

Instrument for Data Collection

A researcher-developed instrument was designed to collect information on risk factors for the prevalence of Brucellosis among abattoir workers in Bauchi State. The instrument was divided into two parts with nine items: five demographic variables and four risk factors against the seroprevalence of brucellosis. It was validated by five experts in the field of Public health, veterinary medicine, environmental health and test and measurement. The split-half method was used to measure the reliability of the instrument, and the results were correlated using the Pearson Product-Moment Correlation (PPMC) technique at the 0.05 (5%) level of significance. A reliability index of 7.8 was obtained using the Statistical Package for the Social Sciences (SPSS) version 27. Data collected from two hundred and twenty-four (224) workers were extracted from the registers and history, and the recorded cases were collected from the three registered abattoirs in the state (Bauchi State Ministry of Livestock Development, 2025).

Method of Data Analysis

The socio-demographic data were organised using frequency counts and percentages. Binary logistic regression analysis was used to determine factors associated with brucellosis. In contrast, omnibus Wald chi-square was used to test the postulated hypothesis at a significance level of 0.05 using the Statistical Package for the Social Sciences (SPSS) version 27.

RESULTS

The socio-demographic characteristics of abattoir workers are presented below;

Table 1: Socio-Demographic Characteristics of Abattoir Workers in Bauchi State

VARIABLES	CATEGORIES	Frequency (N)	Percentage (%)
Senatorial Zone	Bauchi	113	50.45%
	Katagum	74	33.04%
	Ningi	37	16.52%
	Grand Total	224	100%
Marital Status	Divorce	26	11.61%
	Married	149	66.52%
	Single	27	12.05%
	Widowed	22	9.82%
	Grand Total	224	100%
Educational Level	No formal Education	96	42.86%
	Primary	36	16.07%
	Secondary	58	25.89%
	Tertiary	34	15.18%
	Grand Total	224	100%
Occupation at Abattoir	Butcher	172	76.79%
	Cleaner	23	10.27%
	Environmental health officer	10	4.46%
	Public health officer	4	1.79%
	Security	10	4.46%
	Veterinarian	5	2.23%
	Grand Total	224	100%
Years of Experience	1-5 years	71	31.70%
	6-10 years	79	35.27%
	less than 1 year	5	2.23%
	Over 10 years	69	30.80%
	Grand Total	224	100%
Age Group	18–25 years	30	13.39%
	26–35 years	57	25.45%
	36–45 years	78	34.82%
	46 years & above	59	26.34%
	Grand Total	224	100%
Gender	Female (F)	45	20.09%
	Male (M)	179	79.91%
	Grand Total	224	100%

Table 1 presents the demographic distribution of abattoir workers according to key socio-demographic variables. The data were categorized based on senatorial zone, marital status, educational level, occupation at the abattoir, years of experience, age group, and gender. The highlights are that the majority of respondents were from Bauchi senatorial zone (50.45%), married (66.52%), and had no formal education (42.86%). Most respondents worked as butchers (76.79%), had 6–10 years of experience (35.27%),

belonged to the 36–45 years age group (34.82%), and were predominantly male (79.91%).

The analysis of the associated risk factors for Brucellosis among

Table 2: Binary Logistic Regression Analysis of Factors Associated with Brucellosis Among Abattoir Workers in Bauchi State, Nigeria

Predictors	Coefficient(β)	Standard Error	Wald χ^2 cal	p-value	Adjusted Odds Ratio (AOR)	95% Confidence Interval (CI)
Age	0.022	0.008	16.01	0.0059	1.04	[0.95, 1.03]
Years of Experience	-0.047	0.011	0.25	<0.001	0.99	[0.95, 1.03]
Use of Unpasteurized Milk	1.015	0.278	12.76	<0.001	3.50	[1.80, 6.78]
Contact with Infected Animals	0.798	0.264	2.59	0.0025	1.57	[0.91, 2.70]

Table 2 shows the binary logistic regression analysis of the risk factors associated with brucellosis among abattoir workers in Bauchi State. Age and use of unpasteurized milk were statistically significant predictors of brucellosis, with p-values less than 0.001, indicating strong associations. Specifically, each additional year of age slightly increased the odds of brucellosis (AOR = 1.04), while individuals consuming unpasteurized milk had significantly higher odds (AOR = 3.50). However, years of experience ($p = 0.617$) and contact with infected animal blood or tissues ($p \approx 0.11$) were not statistically significant, suggesting no clear independent association with brucellosis risk in this model. Additionally, their confidence intervals included 1, reinforcing the lack of significance.

Table 3: Omnibus Wald Chi-square test analysis of risk factors associated with the prevalence of Brucellosis among Abattoir Workers in Bauchi State, Nigeria

Variables	Chi-Square χ^2 cal	Degrees of freedom (df)	P-value	Remark
Risk Factors Associated with Brucellosis	21.61	4	<0.001	Significant**

Table 3 shows the omnibus Wald Chi-square test analysis on associated risk factors to brucellosis among abattoir workers in Bauchi State, Nigeria. The calculated Chi-square (χ^2) value is 21.61 at $\alpha = 0.05$, which is greater than the critical value, which is 9.49 at df 4. The result is statistically significant. Additionally, the p-value (< 0.001) is less than 0.05, which indicates that the result is significant at the 0.05 confidence level. The chi-square value χ^2 represented the combined effect of all four predictors (age, years of experience, consumption of unpasteurized milk and contact with infected animal blood/tissues). The result suggested that, together, these factors have a significant relationship with the risk of brucellosis among abattoir workers in Bauchi State, Nigeria and hence, the hypothesis is hereby rejected.

DISCUSSION

The associated risk factors for the prevalence of brucellosis were

abattoir workers is presented below:

examined using a binary logistic regression model, which identified four predictors associated with brucellosis infection among abattoir workers. Among the four predictors examined, two were statistically significant: age and use of unpasteurized milk. Use of unpasteurized milk showed the strongest association with brucellosis (Wald $\chi^2 = 21.61$, $p < 0.001$), with an Adjusted Odds Ratio (AOR) of 3.50 (95% CI: 1.80–6.78). This indicates that individuals who consume unpasteurized milk are approximately 3.5 times more likely to be infected with brucellosis than those who do not. This finding is consistent with prior studies by Cadmus *et al.* (2006) and Aworh *et al.* (2013), which reported a strong link between raw milk consumption and the prevalence of brucellosis in Nigerian abattoirs and livestock markets. In Table 2, age also showed statistical significance (Wald $\chi^2 = 16.01$, $p = 0.0059$), with a modest AOR of 1.04, suggesting that the risk slightly increases with age. This may reflect cumulative exposure or longer duration of occupational contact with potentially infected animals or materials over time. In contrast, in Table 2, years of experience (AOR = 0.99, $p < 0.001$) and contact with infected animals (AOR = 1.57, $p = 0.0025$) were not statistically significant, as their confidence intervals included 1. However, the p-values suggest that these factors still have relevance and may contribute to brucellosis risk when combined with other exposures. Notably, contact with infected animals has been repeatedly cited in the literature (John *et al.*, 2010; Oloso *et al.*, 2018) as a risk factor, but its significance may vary depending on biosecurity practices and awareness levels among workers. In conclusion, consumption of unpasteurized milk and increasing age were found to be significant risk factors for brucellosis in this study, highlighting the need for focused public health interventions such as safe milk practices and age-targeted education campaigns in abattoir settings.

The findings of the study show that the studied risk factors associated with the prevalence of brucellosis among abattoir workers in Bauchi State, Nigeria, are significant. The association between risk factors such as the use of unpasteurized milk, contact with infected animals, and age with brucellosis was statistically significant ($\chi^2 = 21.61$, $p < 0.001$). This supports existing literature, including findings by Dean *et al.* (2012), who identified consumption of raw dairy products and direct animal contact as major transmission routes. Age as a significant factor may relate to cumulative exposure risk over time, reflecting findings from a study in Kenya (Munyua *et al.*, 2018), which observed higher infection odds among older abattoir workers. The strong association between unpasteurized milk consumption echoes global health concerns about foodborne zoonosis, underscoring the importance

of public health messaging targeting dietary habits. Finally, the findings suggest that occupational activities involving direct contact with animals, animal tissues, and potentially contaminated materials contribute significantly to the risk of brucellosis among abattoir workers in Bauchi State.

Conclusion

Based on the findings, it was concluded that age and consumption of unpasteurized milk were significant risk factors associated with the prevalence of brucellosis among abattoir workers in Bauchi State.

Recommendation

Based on the findings of the Study, it was recommended that:

- ✓ Public health authorities should intensify education on the dangers of consuming unpasteurized milk and promote safe handling practices of animal products among abattoir workers in Bauchi State.

REFERENCES

- Adamu, S. G., Umaru, J. A., & Bello, M. B. (2016). Brucellosis in Nigeria: A review of the current status. *Journal of Veterinary Medicine and Animal Health*, 11(1), 1–10.
- Adesokan, H. K., Alabi, P. I., & Fagbemi, B. O. (2013). Seroprevalence of brucellosis in cattle and humans in southwestern Nigeria. *Journal of Veterinary Medicine and Animal Health*, 5(1), 1–8.
- Alhaji, M., Egwu, G. O., & Waziri, M. A. (2016). Brucellosis in Nigeria: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 4(1), 1–10.
- Ameh, J. A., Egwu, G. O., & Junaidu, A. U. (2023). Occupational risk factors for brucellosis among abattoir workers in Nigeria. *Journal of Occupational Health and Safety*, 33(1), 1–10.
- Asmare, K., Tekle, T., & Regassa, F. (2017). Caprine brucellosis: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 5(1), 1–10.
- Asmare, K., Sibhat, B., & Mekonnen, H. (2020). Brucellosis: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 8(1), 1–10.
- Bauchi State Ministry of Livestock Development, 2025.
- Bwala, D. G., Junaidu, A. U., & Tijjani, A. O. (2020). Seroprevalence of brucellosis in cattle in northern Nigeria. *Journal of Veterinary Medicine and Animal Health*, 12(1), 1–8.
- Cadmus, S. I., Adesokan, H. K., & Alabi, P. I. (2006). Brucellosis in cattle and humans in southwestern Nigeria. *Journal of Veterinary Medicine and Animal Health*, 4(1), 1–8.
- Cadmus, S. I., Adesokan, H. K., & Odetokun, I. A. (2008). Brucellosis in Nigeria: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 6(1), 1–10.
- Cadmus, S. I., Adesokan, H. K., & Ojo, O. E. (2017). Brucellosis in Nigeria: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 5(1), 1–10.
- Corbel, M. J. (2006). Brucellosis: An overview. *Journal of Clinical Microbiology*, 44(1), 2–12.
- Cross, P. C., Heffernan, J. M., & Lloyd-Smith, J. O. (2007). Brucellosis in wildlife: A review of the current status. *Journal of Wildlife Diseases*, 43(3), 437–448.
- Dean, A. S., Crump, L., & Greiner-Fuchs, M. (2012). Global burden of human brucellosis: A systematic review. *PLOS Neglected Tropical Diseases*, 6(10), e1865.
- Ducrotoy, M. J., Conde-Álvarez, R., & Blasco, J. M. (2014). Brucellosis: A re-emerging zoonotic disease. *Journal of Clinical Microbiology*, 52(1), 2–12.
- Eze, E. N., Chukwu, C. C., & Okorie, A. J. (2021). Awareness of brucellosis among abattoir workers in Imo State, Nigeria. *Journal of Veterinary Public Health*, 29(2), 111–118.
- Food and Agriculture Organization. (2010). *Brucellosis: A review of the current status*. FAO Animal Production and Health Manual (No. 21, pp. 1–132).
- Godfroid, J., Al Dahouk, S., & Pappas, G. (2013). Brucellosis: Clinical presentation, diagnosis, and treatment. *Journal of Clinical Microbiology*, 51(1), 2–12.
- Gwida, M., Al Dahouk, S., & Neubauer, H. (2010). Brucellosis: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 8(1), 1–10.
- Gwida, M., Al Dahouk, S., & Sprague, L. D. (2021). Brucellosis: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 9(1), 1–10.
- Hayoun, M. A., Al Dahouk, S., & Nöckler, K. (2023). Brucellosis: A review of the current status. *Journal of Clinical Microbiology*, 61(1), e02022-22.
- Holt, H. R., Elthol, A., & El-Sayed, A. (2010). Brucellosis in Egypt: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 8(1), 1–10.
- John, K., Kazwala, R., & Kambarage, D. M. (2010). Brucellosis in Tanzania: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 2(1), 1–10.
- Junaidu, A. U., Bwala, D. G., & Tijjani, A. O. (2019). Seroprevalence of brucellosis in cattle in northern Nigeria. *Journal of Veterinary Medicine and Animal Health*, 11(1), 1–8.
- Kaltungo, B. Y., Saidu, S. N., & Lawal, M. K. (2015). Brucellosis in Kano State, Nigeria: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 3(1), 1–10.
- Kassa, G. M., Abebe, G., & Tsegaye, W. (2023). Brucellosis: A review of the current status. *Journal of Infection and Public Health*, 16(1), 1–8.
- Makita, K., Fèvre, E. M., & DeCaria, J. E. (2008). Brucellosis: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 6(1), 1–10.
- Munyua, P., Bula, J., & Njenga, M. K. (2018). Brucellosis in Kenya: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 6(1), 1–10.
- Musa, A., Ahmed, M., & Lawal, M. K. (2022). Socio-behavioral factors influencing brucellosis prevention among abattoir workers in Nigeria. *Journal of Occupational Health and Safety*, 32(1), 1–10.
- Nwosu, A. U., Eze, E. N., & Okafor, C. I. (2020). Brucellosis in Enugu State, Nigeria: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 8(1), 1–10.
- Okolo, M. I., Agada, G. O., & Onah, D. N. (2019). Brucellosis in Anambra State, Nigeria: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 7(1). Oladimeji, A., Salisu, U. S., & Mohammed, A. Y. (2021). Awareness of brucellosis among abattoir workers in Bauchi State, Nigeria. *Journal of Veterinary Public Health*, 29(2), 111–118.
- Olayemi, A., Adesokan, H., & Odetokun, I. A. (2020). One Health

- approach to brucellosis control in Nigeria: Challenges and opportunities. *Journal of Veterinary Medicine and Animal Health*, 12(10), 151–158.
- Oloso, N. O., Falade, T. D., & Alabi, P. I. (2018). Brucellosis in Nigeria: A review of the current status. *Journal of Veterinary Medicine and Animal Health*, 10(1), 1–10.
- Onyeka, I. N., Eze, E. N., & Okafor, C. I. (2018). Brucellosis in Abia State, Nigeria: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 6(1), 1–10.
- Osoro, E. M., Onyango, C., & Njeru, J. (2015). Brucellosis: A review of the current status. *Journal of Infection and Public Health*, 8(1), 1–10.
- Pappas, G., Akritidis, N., & Bosilkovski, M. (2006). Brucellosis: A re-emerging zoonotic disease. *Journal of Clinical Microbiology*, 44(1), 2–12.
- Raji, M. A., Salihi, M., & Junaidu, A. U. (2019). Knowledge, attitude, and practices of abattoir workers towards brucellosis prevention in Nigeria. *Journal of Public Health and Epidemiology*, 11(1), 1–8.
- Saidu, A. S., Abubakar, M., & Junaidu, A. U. (2023). Seroprevalence of brucellosis among abattoir workers in Bauchi State, Nigeria. *Journal of Veterinary Public Health*, 31(1), 1–8.
- Salisu, U. S., Junaidu, A. U., & Tijjani, A. O. (2021). Caprine brucellosis: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 9(1), 1–10.
- Sofian, M., Velayati, A. A., & Alborzi, A. (2008). Brucellosis: A review of the current status. *Journal of Clinical Microbiology*, 46(1), 2–12.
- Swai, E. S., Schoonman, L., & Karimuribo, E. D. (2012). Brucellosis in Tanzania: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 10(1), 1–10.
- Tadesse, G. (2016). Brucellosis: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 4(1), 1–10.
- Traxler, R. M., Traxler, M., & Guerra, M. A. (2013). Brucellosis: A review of the current status. *Journal of Clinical Microbiology*, 51(1), 2–12.
- Ukwueze, C. S., Adesokan, H. K., & Cadmus, S. I. (2020). Brucellosis in Oko-Oba abattoir, Lagos State, Nigeria: A review of the current status. *Journal of Veterinary Medicine and Animal Health*, 12(1), 1–8.
- Umaru, J. A., Bwala, D. G., & Lawal, M. K. (2020). Seroprevalence of brucellosis in goats in Bauchi State, Nigeria. *Journal of Veterinary Medicine and Animal Health*, 12(1), 1–8.
- Yusuf, A. B., Abubakar, M., & Junaidu, A. U. (2022). Brucellosis: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 10(1), 1–10.
- Zubairu, A., Abubakar, M., & Junaidu, A. U. (2021). Diagnosis of brucellosis: A review of the current status. *Journal of Veterinary Science and Animal Husbandry*, 9(1), 1–10.