

Seroprevalence of Brucella among Patients Visiting a Single-Center Hospital: A Cross-Sectional Study

Sakariye Abdullahi Hassan-Tuuryare^{1*}; Suleyman Abdullahi Mohamed²; Timothy Kimutai³

¹MSc Tropical and Infectious Diseases Specialist, Head of Infectious Diseases and Research Department Kalkaal Hospital

²General Surgery, CEO Kalkaal Hospital

³Statistician Kalkaal Hospital Mogadishu, Somalia

Corresponding Author:- Sakariye Abdullahi Hassan-Tuuryare^{1*}

Abstract:-

➤ Introduction:

Brucellosis is a disease that can be contracted by humans through contact with infected animals or animal products. It can be transmitted through contaminated dairy products, so caution must be exercised when handling and preparing food. By taking precautions, the spread of this disease can be mitigated to protect both humans and animals. (1) Brucella spp is a type of bacteria that can cause an infection. The symptoms of this infection can range from mild flu-like symptoms to severe complications that affect different parts of the body. Because Brucella is able to invade the body and avoid the immune system, it's important to get an accurate diagnosis and start treatment as soon as possible. (2). (3)

➤ Method:

The study was conducted at Kalkaal Hospital from 2019 to 2023, spanning three years. Patients who went to the hospital's Outpatient department and were screened for Brucella were included in the study. Data on patients' demographics, including their residence, gender, age, and Brucella screening results, were collected and recorded over the study period. The participants' blood samples were gathered and analyzed for Brucella infection through a variety of diagnostic The clinical assessment included an examination of symptoms, medical history, and possible exposure to Brucella. To detect specific antibodies (IgM and IgG) against Brucella present in the blood serum, serological tests such as the Serum Agglutination Test (SAT), ELISA, and Rose Bengal Test were conducted. The blood samples were analyzed to identify the Brucella bacteria through blood cultures. In addition, the presence of Brucella DNA was confirmed in various clinical samples using Polymerase Chain Reaction (PCR). The Kalkaal Hospital Research Review Board gave approval for the study protocol. Data cleaning was carried out with the help of Excel. The analysis of data was performed using SPSS software version 25.

➤ Results:

According to the analysis of the data, 30.3% of patients were men, and 69.7% of patients were women. The age ranges were 0–19: 1245 (8.1%), 20–29: 3951 (25.7%), 30–39: 3027 (19.7%), 40–49: 1786 (11.6%), and

50+: 4582. (29.9 percent). In addition, 14884 (97.0%) of the outcomes were negative, while only 465 (3.0%) were positive.

➤ Conclusion:

The research carried out at Kalkaal Hospital in Mogadishu, Somalia, has revealed important information about the prevalence of Brucella infection in the area. The results suggest that a significant number of patients have tested positive for Brucella antibodies, which indicates that the disease is a significant burden on the local population. These findings add to the global knowledge of brucellosis and emphasize its severe and long-term effects. It is important for experts in this field to have further discussions and come to a consensus on how to address this issue.

I. INTRODUCTION

Brucellosis is a disease that can be contracted by humans through contact with infected animals or animal products. It can be transmitted through contaminated dairy products, so caution must be exercised when handling and preparing food. By taking precautions, the spread of this disease can be mitigated to protect both humans and animals. (1) Brucella spp is a type of bacteria that can cause an infection. The symptoms of this infection can range from mild flu-like symptoms to severe complications that affect different parts of the body. Because Brucella is able to invade the body and avoid the immune system, it's important to get an accurate diagnosis and start treatment as soon as possible.(2).(3)

Brucella is transmitted either by coming into contact with infected animals or by consuming animal products that have been contaminated, such as unpasteurized cheese or milk.(4). People who work with animals or in slaughterhouses are at high risk of getting infected. Also, there is a chance of transmission through sexual contact or from an infected mother to her child during pregnancy, although this happens rarely.(5).

➤ Globally:

The global health sector strategies, recognized by the World Health Organization (WHO), give importance to tackling zoonotic diseases like Brucella. These strategies

focus on lessening the burden of sexually transmitted infections (STIs) and zoonotic diseases, and giving priority to eliminating congenital Brucella cases.(6). (7)It is crucial to implement measures for prevention, screening, and treatment in order to decrease the number of new infections and their associated complications. (8)

In Africa, Brucella is still a major health problem, especially in areas with many domestic animals and limited resources for disease control and surveillance. The prevalence and effects of the disease vary across different African regions and countries, underscoring the importance of conducting localized studies to guide focused interventions.(9) It is crucial to gain insight into the epidemiology and impact of Brucella in Africa in order to create effective strategies to control and prevent the disease.(10)

In Somalia, there is a lack of information regarding the occurrence and attributes of Brucella infections among the populace. Somalia's substantial livestock sector and consumption of animal-based goods raise concerns about the transmission of Brucella. Analyzing the prevalence and characteristics of Brucella in Mogadishu and other areas of Somalia would offer valuable guidance for preventing, detecting early on, and managing the disease.

The objective of the research was to establish the percentage of individuals who tested positive for Brucella antibodies, which would shed light on the extent of the disease's impact on the community.

II. METHODS

➤ Study Design and Setting:

This is a cross-sectional study carried out among patients who attended Kalkaal hospitals between June 2019 and July 2023, a period of three years.

➤ Study Participants and Variables:

Between the years of June 2019 and July 2023, a cross-sectional study was conducted among patients who visited

Kalkaal hospitals. The study focused on patients who underwent Brucella screening at the hospital's Outpatient department, and relevant data such as age, gender, place of residence, and screening results were collected and recorded in the system.

➤ Definitions and Diagnostic Approach

Diagnostic approaches included blood tests, clinical evaluation, and serological tests such as SAT, ELISA, and Rose Bengal Test. Blood cultures were conducted to identify the Brucella bacteria, and PCR was used to confirm the presence of Brucella DNA in various clinical samples.(11)

➤ Ethical Approval:

The patients were required to sign an informed consent form and were made aware that their data would be utilized for research purposes before any screenings or blood sample collections were conducted. The study protocol was approved by the Kalkaal Hospital Research Review Board.

To analyze the data, Microsoft Excel was used for cleaning and SPSS software version 25 was used for processing the analyzed data. Descriptive statistics were used to summarize the demographic characteristics of the study population, such as their age, gender, and residence, using descriptive statistics. They also calculated the prevalence of Brucella infection by analyzing the results of serological tests, blood cultures, and PCR. To determine any significant findings, they applied appropriate statistical tests and assessed the associations between variables.

III. RESULTS

➤ “Demographic”

According to the analysis of the data, 30.3% of patients were men, and 69.7% of patients were women. The age ranges were 0–19: 1245 (8.1%), 20–29: 3951 (25.7%), 30–39: 3027 (19.7%), 40–49: 1786 (11.6%), and 50+: 4582. (29.9 percent). In addition, 14884 (97.0%) of the outcomes were negative, while only 465 (3.0%) were positive.

Table 1 Demographic

Variable	Category	Frequency	Percentage
Sex	Female	10705	69.7%
	Male	4644	30.3%
Age	0-19	1245	8.1%
	20-29	3951	25.7%
	30-39	3027	19.7%
	40-49	1786	11.6%
	50>	4582	29.9%
Results	Negative	14884	97.0%
	Positive	465	3.0%

➤ Bivariate Analysis

According to the data's bivariate analysis, the positives were aged 0 to 19: 49 (3.9%), 20 to 29: 138(3.5%), 30-39: 89(2.9%), 40 to 49: 54(3.0%), and 50+: 108. (2.4 percent). In

terms of sex, there were 2.4 percent more males than females who tested positive for Brucella. The information shows that there is a statistically significant difference between men and women.

Table 2 Bivariate Analysis

	Category	Negative	Positive	Total	P-Value
Age Groups	0-19	1196(96.1%)	49(3.9%)	1245(100.0%)	.009
	20-29	3813(96.5%)	138(3.5%)	3951(100.0%)	
	30-39	2938(97.1%)	89(2.9%)	3027(100.0%)	
	40-49	1732(97.0%)	54(3.0%)	1786(100.0%)	
	50>	4474(97.6%)	108(2.4%)	4582(100.0%)	
Gender	Female	10353(96.7%)	352(3.3%)	10705(100.0%)	.003
	Male	4531(97.6%)	113(2.4%)	4644(100.0%)	

➤ Prevalence in Different Age Groups Per Gender

The prevalence was 30 (3.7%) among girls aged 0–19, compared to 19 (4.3%) among their male counterparts, and 116 (3.9%) among females aged 20–29, compared to 22 (2.3%) among their male counterparts. The prevalence among those between the ages of 30–39 was 75 (3.6%) for females

and 14 (1.4%) for men in the same age range. Except for the ages 40–49, where brucella was common among men, females had a higher frequency of the disease than males throughout all age categories. There was a statistically significant difference among different ages for both females and males, with $p=0.018$ and $p=0.01$, respectively.

Table 3 Prevalence in Different Age Groups Per Gender

Gender	Age Group	Negative	Positive	Total	P-Value
Female	0-19	774(96.3%)	30(3.7%)	804	0.018
	20-29	2863(96.1%)	116(3.9%)	2979	
	30-39	1984(96.4%)	75(3.6%)	2059	
	40-49	1242(97.1%)	37(2.9%)	1279	
	50>	2965(97.5%)	75(2.5%)	3040	
Male	0-19	422(95.7%)	19(4.3%)	441	0.01
	20-29	950(97.7%)	22(2.3%)	972	
	30-39	954(98.6%)	14(1.4%)	968	
	40-49	490(96.6%)	17(3.4%)	507	
	50>	1509(97.9%)	33(2.1%)	1542	

IV. DISCUSSION

According to the analysis of the data, 30.3% of patients were men, and 69.7% of patients were women. The age ranges were 0–19: 1245 (8.1%), 20–29: 3951 (25.7%), 30–39: 3027 (19.7%), 40–49: 1786 (11.6%), and 50+: 4582. (29.9 percent). In addition, 14884 (97.0%) of the outcomes were negative, while only 465 (3.0%) were positive.

The results of the bivariate analysis provide insights into the prevalence of brucella infection among different age groups and genders. Let's discuss the findings in more detail:

Bivariate Analysis: The data reveals the prevalence of brucella infection among different age groups. The percentages of positive cases in each age group are as follows: 0-19: 3.9%, 20-29: 3.5%, 30-39: 2.9%, 40-49: 3.0%, and 50+: 2.4%. This analysis provides an overview of the distribution of brucella infection across various age categories.

Gender Differences: The data indicates that there were 2.4% more males than females who tested positive for brucella infection. This finding suggests that males may have a slightly higher prevalence of the disease compared to females. The statistically significant difference between men and women confirms that there is a notable disparity in brucella infection rates based on gender.

Prevalence in Different Age Groups per Gender: The data presents the prevalence of brucella infection within specific age groups and compares the frequencies between males and females.

Among individuals aged 0-19, the prevalence was 3.7% among girls and 4.3% among boys. This indicates a similar level of susceptibility to brucella infection in this age group, with boys showing a slightly higher prevalence.(12)

In the age group of 20-29, the prevalence was 3.9% among females and 2.3% among males. This suggests that young adult females have a higher frequency of brucella infection compared to males in the same age range.(13)

Among individuals aged 30-39, the prevalence was 3.6% among females and 1.4% among males. This indicates a significantly higher prevalence among females in this age group.

For the age group 40-49, the data states that brucella infection was more common among men compared to women, but specific prevalence percentages or case numbers are not provided.

In the 50+ age group, the prevalence was 2.4% for both genders, indicating a similar frequency of brucella infection among older individuals.

Overall, Gender Differences: Throughout all age categories, except for the 40-49 age group, females consistently had a higher frequency of brucella infection compared to males. This observation suggests that females may be more susceptible to brucella infection across different age groups. Statistical Significance: The statistical analysis conducted on the data indicates a statistically significant difference among different age groups for both females ($p=0.018$) and males ($p=0.01$). These p-values suggest that the observed differences in prevalence across age groups are unlikely to have occurred by chance, further supporting the significance of the findings.

It is essential to consider that the discussion relies on the provided data and the context of the study. Additional information, such as the sample size, geographical location, and specific risk factors, could provide a more comprehensive understanding of the prevalence patterns and their implications.

V. LIMITATIONS

The study's cross-sectional design merely offers a momentary glimpse of the prevalence of *Brucella* infection during the study's duration and does not establish any causal relationships. It's important to note that this study was conducted in a particular hospital setting, and its results may not be universally applicable to other populations or regions. Despite these limitations, the study provides valuable insights into the prevalence of *Brucella* infection among patients who visit Kalkaal Hospital.

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