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Brucellosis in Rajasthan: A Call to Wake Up

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ABSTRACT
Brucellosis being one of the most neglected diseases in the world, with incidence as high as 12.5 lac cases per year, is always a threat to the Indian population considering the majority proportion being rural with their heavy domestic livestock maintenance. The current study was planned with a purpose to study the socio-demographic factors and trend analysis of the ELISA confirmed Brucellosis cases. The current study is a retrospective data-based analysis of the ELISA confirmed Brucellosis cases registered under Integrated Disease Surveillance Project (IDSP), Rajasthan from 2019 to 2022. The socio-demographic details of the patients were compared and trend analysis was done amongst the various years. X2 tests were used to derive any significant data. Maximum patients with Brucellosis were females and in age-group of 19 years to 30 years with mean age of 27.98 years. Most of the cases were reported from the districts Jaipur (43.8%), Bikaner (12.8%) and Churu (8.3%). Almost 44% cases presented with an acute illness of duration less than 10 days and only 1.1% presented with an illness of >30 days. The Brucellosis cases in Rajasthan spiked in the fourth quarter of 2021 and third quarter of 2022. Brucellosis because of its non-specific symptoms and hidden widespread prevalence needs an elaborate investigation for the seroprevalence amongst the general population of the state and the country at large and definite measures to curb its impact on physical and financial health of the people of the nation.

INTRODUCTION

Brucellosis also known as Undulent fever, the major bacterial zoonosises transmitted to man by direct or indirect contact with infected animals and caused by different types of bacteria Brucella[1]. Currently, Brucella melitensis accounts for most recorded cases globally with cattle emerging as an important reservoir with the few cases of *B. suis*[2]. It is one of the seven most neglected diseases in the world, incidence estimated 5,000,000 to 12,500,000 cases annually[3]. India being majorly a rural country, 80% population lives in closer proximity to domestic or wild animals which makes it a high-risk population for brucellosis[2-4]. Though some states In India have reported the occurrence of human brucellosis with a general prevalence of 17-34%[5]. This disease is highly under-reported in low-income countries despite causing a substantial health, livelihood and economic losses[6]. In India, brucellosis is an occupational hazard for humans associated with livestock such as milk-handlers, veterinarians or animal handlers[7-10].

Brucellosis is marked by generalized symptoms, a severe and acute illness characterized by persistent, intermittent or irregular fever, headaches, weakness, sweating, joint pain, depression, weight loss, splenomegaly and myalgia in the patients[11-13]. The disease is more common in men than women[14]. Brucellosis in animals presents as a chronic infection that persists for life and the bacteria are shed in large numbers in body secretions like milk, urine and products of pregnancy,[15-17] which causes infertility, repeat breeding, retention of placenta, abortions and lower milk production in livestock leading to enormous economic losses[18]. And the contact with the infected animal fluids, the consumption of raw dairy products and undercooked meat are some of the causes of transmission in humans[19].

Diagnosis of Brucellosis include isolation and identification of Brucellae from clinical samples, detection of antigen, genome and antibodies. Blood culture is definitive but not always positive.2 In India, ELISA testing against Brucella antigen is used as an acceptable alternative to blood culture for confirmation of Brucellosis in humans. In a country like India which highly depends on livestock, exacting the Brucellosis cases seems near impossible. However, few steps should be promoted in order to keep a check on its burden in the country such as routine serological surveillance, keeping a high clinical suspicion with the suggestive history and timely screening of family members of index cases, keeping the records updated and vaccination drives amongst the animal population, etc[2]. However, prevalence of brucellosis in India though expected to be high, is not much studied. Multiple reasons can be attributed to it such as undocumented census of the livestock, diagnostic challenges which demands rapid, sensitive and specific testing methodologies, non-specific treatment strategies which delays its detection, yet unavailability of a safe and effective vaccine in humans and dependence on the public awareness and health education for its prevention which in itself an extensive and tiresome process[2]. Keeping in mind these gaps, the current study was planned with a purpose to study the socio-demographic factors and trend analysis of the ELISA confirmed Brucellosis cases.

MATERIALS AND METHODS

Study place: Directorate of medical health, Jaipur and Dept of Community medicine, PDUMC, Churu.

Study design: A retrospective data based analytical study.

Study population: All the symptomatic patients coming to the health institutions with the testing facility (District Hospital and Medical college) of Rajasthan were registered under Integrated Disease Surveillance Project (IDSP) and were administered with the battery of tests. Brucellosis was tested using ELISA test.

Sample size: All those patients who were tested positive by ELISA for Brucellosis from 2019 to 2022 and who were registered under IDSP were the sample of the study.

Method of the study: All the patients with symptoms, mainly fever, coming to the health institutions with the testing facility (District Hospital and Medical college) of Rajasthan and those who are advised for ELISA test for Brucellosis are registered under IDSP. At the same time, the data regarding the complete history of the patient and sociodemographic details of the patients are collected and recorded in either offline registers or online portal. The IDSP district and state cell maintains all these data in year wise databases and the data for all the positive cases can be extracted from offline/online mode.

In the current study, the year wise details of the lab confirmed Brucellosis was extracted from the ICDS database from 2019 to 2022. The data was available in both online and offline mode as portal started in 2021. The socio-demographic details of the patients were compared amongst the various years. The trend analysis was also done for the lab confirmed cases. The appropriate statistical tests like X2 tests were used to derive any significant data. The written consent for collecting and analyzing the data was taken from the competent authority, Director, IDSP, Rajasthan.

RESULTS

The data in the current analysis showed that the maximum patients of Brucellosis belong to the age-group of 19 to 30 years (age related data of 3.2% patients was missing) with a mean age of 27.98 ±14.43
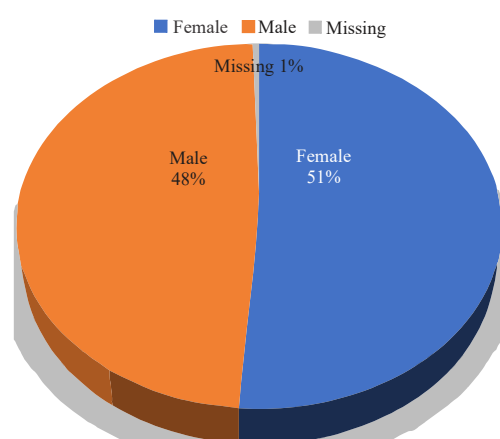
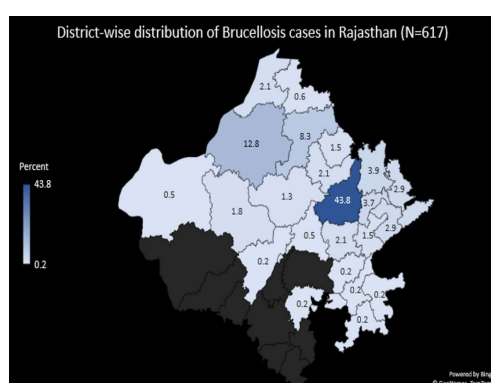Fig. 1: Distribution of Patients according to gender (N = 617)

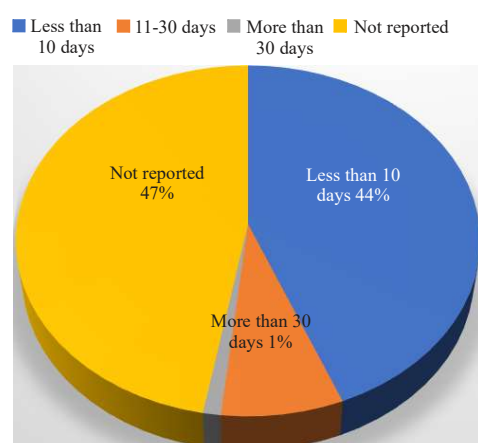Fig. 2: Distribution of Patients according to Districts (N = 617)

Fig. 3: Distribution of Patients according to Duration of illness (N = 617)

years (Table 1) and female gender (51.2%) with a missing gender related data of 3 patients (Fig. 1). However, amongst the patients, no statistically significant association was observed between the age and gender (Table 2).

The data in the current study also showed that the Brucellosis patients that were registered with IDSP were maximum from the districts Jaipur (43.8%), Bikaner (12.8%) and Churu (8.3%). Around 2.3% patients registered were from other states like Haryana, UP and Bihar. Also, the district wise details of 11 patients (1.8%) could not be traced. (Fig. 2) Limitedly, the history of the duration of illness could not be traced in almost half of the patients (47.2%, n = 291). In total 326 (52.8%) patients who complained of any symptoms, maximum (43.9%) presented with an acute illness of duration <10 days and only 1.1% presented with an illness of <30 days.

We tried to read the trend of the reported Brucellosis cases over the years 2019-2022 and upto first two quarters of 2023 in Rajasthan with the available data of the IDSP (Fig. 4) and observed that the Brucellosis cases spiked in the fourth quarter of 2021 and third quarter of 2022, probably attributing to the seasonal variation of the disease or the increased human-animal contact in these quarters. The cases have been constantly lower in the first two quarters of all the years. The decreased trend of Brucellosis cases in the year 2020 could be attributed to the COVID-19 epidemic in India when the reporting system of other disease was not equally active as other years and human resources were diverted into COVID-19 management in the state as well as the country.

DISCUSSIONS

The current study was a retrospective data based analytical study done in the Directorate of medical health, Jaipur and Department of Community medicine, PDUMC, Churu on a total of 617 patients who were tested positive by ELISA for Brucellosis from 2019 to 2022 and who were registered under IDSP. In our study, we observed that the mean age of patients with brucellosis was 28 years ranging from 19 to 30 years which are some of the most professionally active years especially ones with the profession related to animal handling and livestock management. The disease in this age group may also be attributed to higher consumption of dairy products as well as more mobilization in rural areas making them more susceptible for this disease. Further, females were affected slightly more than males, however, the difference was statistically non-significant. These results were comparable with results concluded by Shukla JL et al and Parai D et al both of which reported the similar results. In rural India, females tend to maintain as well as breed the cattle in the household and males tend to sell out the milk and meat. This vague division of labor increases the slight chances of females being more prone for the infection than males. The data also showed that the Brucellosis patients were maximum from Jaipur and Bikaner, making us believe in their better reporting processes and data management skills. It should also be emphasized here
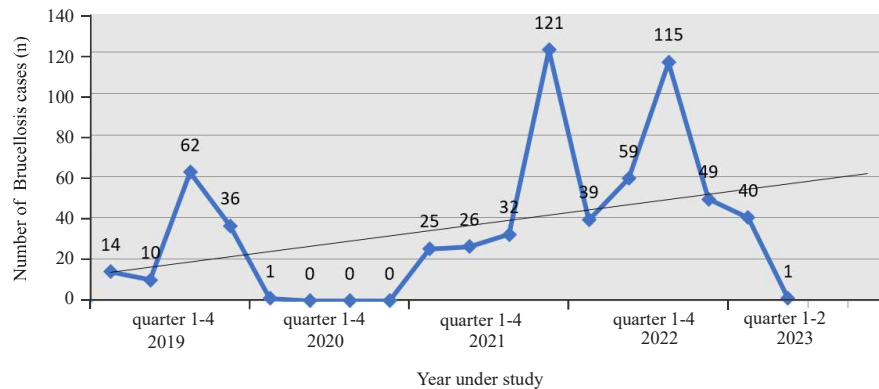
Fig. 4: Quarter-wise trend of the Brucellosis cases in Rajasthan in years 2019-2022 and upto first two quarters of 2023

Table 1: Distribution of patients according to age group (N = 617)

		Frequency	Percent
Age Group in years	Less than 18	132	21.4
	19-30	282	45.7
	31-50	130	21.1
	51-70	49	7.9
	>= 71	4	0.7
	Missing	20	3.2
	Mean±SD	27.98±14.43	

Table 2: Association between Age and Sex. (N = 597)

			Female	Male	
Age Group in years	Less than 18	Count	60	72	0.386
		% within SEX	19.2%	25.4%	
	19-30	Count	153	129	
		% within SEX	48.9%	45.4%	
	31-50	Count	74	56	
		% within SEX	23.6%	19.7%	
	51-70	Count	24	25	
		% within SEX	7.7%	8.8%	
	>=71	Count	2	2	
		% within SEX	0.6%	0.7%	
Total		Count	313	284	597
		% within SEX	100%	100%	

Table 3: Distribution of Patients according to Duration of illness (N = 617)

		Frequency	Percent
Duration of illness in days	Less than 10 days	271	43.9
	11-30 days	48	7.8
	More than 30 days	7	1.1
	Not reported	291	47.2
	Total	617	100

the reporting system or not to forget the mating seasons where the animal handlers have a definite role to play and their poor hygiene practices can land them in trouble. The cases have been constantly lower in the first two quarters of all the years. The decreased trend of Brucellosis cases in the year 2020 could be attributed to the COVID-19 epidemic in India when the reporting system of other disease was not equally active as other years and human resources were diverted into COVID-19 management in the state as well as the country. The data therefore points towards one important fact that there always has been a constant movement of this disease and compels us to work more in this direction.

CONCLUSION

Brucellosis has always delivered a constant presence in various districts of Rajasthan. IDSP has been successful to some extent in maintaining data of its prevalence amongst the population but through a passive approach. However, Brucellosis definitely serves a need to process an elaborate investigation for the seroprevalence amongst the general population of the state in order to determine the definite measures to curb its widespread however hidden prevalence in Rajasthan and India at large.

ACKNOWLEDGMENT

that they carry a large range of rural population and are the most important tertiary centers in the respective zones, thus the chances and responsibility of diagnoses are more with these districts. In-spite of all shortages of human resources, the IDSP cell could follow and maintain the data of more than half of the patients with their presenting symptoms and it was found that maximum patients presented with an acute illness of duration <10 days and only 1.1% presented with an illness of more than 30 days. On tryst with movement of disease over the years, it was realized that Brucellosis cases spiked in the fourth quarter of 2021 and third quarter of 2022, probably attributing to the seasonal variation of the disease or the increased human-animal contact in these quarters. Other reason of the same could also be related to the efficiency of

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