

Salmonella typhi and *Brucella melitensis* prevalence Among Blood Donors Prevalence in Diyala Province

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Received: 22th Dec, 19; Revised: 13th Jan, 20, Accepted: 13th Feb, 20; Available Online: 25th Mar, 2020

ABSTRACT

This study was conducted in Diyala province from 1 Nov. 2016 to April 1, 2017) and included (200) blood samples were used serological tests for diagnosis in the laboratories of Baquba General Teaching Hospital, Blood Bank Department for prevalence of infection by bacteria *Salmonella typhi* and *Brucella melitensis* among blood donors at the Central Blood Bank .

The study showed that the prevalence of *Salmonella spp* and *Brucella* in Diyala (69%) and (31%) respectively. The study also showed that the age group (31–40) is the most susceptible to bacterial infection also the prevalence of *salmonella* in the city is higher than the village where the incidence of *Salmonella* in the city (73.33%) and in the village (26.67%) . The proportion of infection with *Brucella melitensis* in the city (69%) and in the village (30%).

Keyword: Blood donors, *Salmonella typhi*, *Brucella melitensis*.

International Journal of Drug Delivery Technology (2020); DOI: 10.25258/ijddt.10.1.27

How to cite this article: Ibrahim R, Salman AD. *Salmonella typhi* and *Brucella melitensis* prevalence among blood donors prevalence in Diyala Province. International Journal of Drug Delivery Technology. 2020; 10(1):160-163.

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

Salmonella is a genus of gram-negative intestinal bacillus that does not form spores and fermentation of sugars and alcohols and hydrogen sulfide gas produces.¹ A length of between 1 and 7 microns and a thickness of 0.3–0.7 microns, some of which cause food poisoning.² *Salmonella* is a microscopic one-cell microorganism, found in the intestines of animals and humans, transmitted from infected human or animal faces to humans or other healthy animals, or through contaminated food. *Salmonella* contains more than 2,300 strains with the ability to infect human and animal, but the common ones as a cause of the disease confined to the number The most common strain of *Salmonella typhi* is the *Salmonella typhoid*, which was named after the world scientist Daniel Salmon (1850–1914), an American specialist in veterinary pathology and known as *Salmonella* infection and infection for 100 years.³ The symptoms of *Salmonella* infection include fever, Colic, diarrhea and sometimes pain in the joints and appear within 12–72 hours after eating the contaminated food. The sex is divided into several types, including about 1200 serotypes that differ from each other in the antigenic structure and the biochemical properties.⁴

Brucella genus of gram-negative bacteria⁵ named after the name of David Bruce (1855 to 1931).⁶ [Microbes are small in dimensions (0.5–0.7 and 0.6–1.5) nanometers. *Brucella*

causes *Brucellosis*, which is zoonotic, and is transmitted through eating contaminated food (such as unpasteurized milk products), for direct contact with an animal infected with the bacterium, or inhalation of contaminated atmospheric dust. The minimum exposure to this bacterium that causes infection is 10- 100 bacterium. The different types of *brucellae* are very similar genetically, although each has a different host than the rest.

The NCBI classification includes most types of *brucellosis* under the name of *Brucella Maltense*. *Brucellosis* can be called a number of names including: Maltese fever (Bang disease), undulant fever (F) and others. Symptoms of the disease generally appear under incubation period 2-4 weeks Before onset of symptoms, which include acute wavy fever (appearing in more than 90% of cases), headache, arthralgia⁸ (shown in more than 50%) night sweats, fatigue, loss of appetite. Later complications can include inflammation of the joints, testicular inflammation and dizziness, insomnia, neuropathy,⁹ hepatic abscesses, inflammatory inflammation, and then can become fatal.¹⁰ Human *brucellosis* is not transmitted from person to person.¹² In order to clarify the spread of *Salmonella* and *Brucella* bacteria in Iraq, an epidemiological study was conducted to determine the spread of bacteria between blood donors.¹² In order to clarify the spread of *Salmonella* & *Brucella* bacteria in Iraq, In Diyala Governorate for 2016–2017.

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MATERIALS AND METHODS AND PATIENT

Location and Period of Research

The research was carried out in the province of Diyala in the laboratories of the General Hospital of Baquba, Department of Blood Bank, has been in operation since 1 November 2016 until 1 April 2016.

Data of Blood Donar

The information was collected by means of a questionnaire that included many information relevant to the subject and as shown in the table below:

No. of blood donor
Full name
Age
Town or village))
Salmonella (IgG,IgM)
Brucella(IgG,IgM)

Types of Samples Covered in the Study

Blood samples from blood donors ages from 15–40 years. Their blood samples were tested free from hepatitis infection type C,B and free from acquired immunodeficiency syndrome (AIDS).

Method of Sampling

Five mL of venous blood samples from 100 blood donors were collected under the sterilized condition. The samples were different part from Diyala governorate. The blood was drawn in a non-containerized test tube (EDTA) And placed in the centrifuge for 5 minutes for the purpose of separation Serum). The serum was then placed in Ependrophe tube and kept in freezing at -20°C until it was used

Working Method

Method of diagnosis Salmonella

Take 10 μL (microliter) of the donor's serum with a micropipette and put it in the hole below the strip.

** Positive result: - The emergence of two lines =

** Negative result: - The emergence of one line —

Method of diagnosis of Brucella

A blood donor (50 μL) was placed with the IgG on a slid and then mixed with a wood stick. The same step was repeated to control the positive and the negative along with the sample and then to rotate the slide for 2 minutes from the beginning of the shake to the eye, if There wsa appeared agglutination it was positive result, but if not agglutination appear there was negative result.

Statistical analysis

The test method X2 (chi-squared) was used to test the differences between the percentages, and at the level of significance ($\alpha = 0.05$), and the statistical program was used to process and analyze data (STATA M13)

NS= non-significant. $P > 0.05$

* = Significant different $p \leq 0.05$

** = High significant different $p \leq 0.01$

*** = Very high significant different $p \leq 0.001$

RESULTS AND DISCUSSION

Table 1 of the current study shows that the incidence rate in the age group (40–31) is the highest (42%) and the lowest rate was 15–60 (0.50%) with a significant difference under the This agrees with the researcher.^{13,15}

Table 2 shows the percentage of infection with Salmonella bacteria by age groups, it was noted that the highest infection rate for males age group was found in the age group (31–40) where the number of them (36) infected by (40%) in contract with the other age groups where the lowest rate infected in the age group (60-51) was (0) infected by (0%).

The researcher¹³ that the highest incidence of Salmonella bacteria in the category 25–21 number (45) and the proportion (22.5%) has been mentioned in his research reduced the prevalence of the disease among donors on age, where the incidence rate is lower in the age group 55–51. The researcher¹⁴ mentioned in his research the incidence of Salmonella bacteria is high in the age groups (40–20) by 27% as well as shows in his research that the incidence decreases in the category 40–31 by 15.5%, this is not consistent with the results of the current study.

Table 3 shows the percentage of infection with Brucella by age groups. It was noted that the highest infection rate was found in the age groups [(30–21) and (40–31)] and the number respectively [(15.15) by 38.46%, 38.46%]. The other age groups where the infection was few where the infection in the age group (60-51) and the number (0) by 0%, no infection was recorded in this age and a no significant difference below appear. The researcher¹⁵ that the majority of blood donors infected with bacteria Brucella between the ages of (29–20) and number 26. The results of the current study as the percentage of the age group 30–21 by 38.46%.

Table 1: distribution the number of blood donors according to age

Age Period	No.	%	χ^2	Sig.
10-20	8	4.00%	133.15	sig
21-30	69	34.50%		
31-40	84	42.00%		
41-50	38	19.00%		
51-60	1	0.50%		

Table 2: Desertion number of *Salmonella typhi* according to age

		Salmonella		χ^2	Sig.
		Negative	Positive		
10–20	Count	4	4		
	%	3.63	4.44		
21–30	Count	35	34		
	%	31.18	37.7		
Age 31–40	Count	48	36		
	%	43.63	40		
41–50	Count	22	16		
	%	20	17.66		
51–60	Count	1	0		
	%	0.9	0	1.69	Ns
Total	Count	110	90		
	%	100	100		

Table 3: Distribution number of *Brucella melitensis* according to age

			<i>Brucella</i>		X^2	Sig.
			Negative	Positive		
Age	10-20	Count	7	1	0.91	NS
		%	4.3	2.5		
	21-30	Count	54	15		
		%	33.5	38.46		
	31-40	Count	69	15		
		%	42.9	38.46		
	41-50	Count	30	8		
		%	18.6	20.5		
	51-60	Count	1	0		
		%	0.62	0		
Total	Count	161	39			
	%	100	100			

Table 4: Distribution the relationship between *Brucella melitensis* to sex

Donors			<i>Brucella</i>		X^2	Sig.
			Negative	Positive		
Sex	Female	Count	44	7	1.45	NS
		%	27.3	18		
	Male	Count	117	32		
		%	72.7	82		
	Total	Count	161	39		
		%	100	100		

Table 5: distribution the relationship between *Salmonella typhi* to sex

			<i>Salmonella</i>		X^2	Sig.
			Negative	Positive		
Sex	female	Count	29	22	0.09	Ns
		%	26.4	24.45		
	male	Count	81	68		
		%	73.6	75.55		
	Total	Count	110	90		
		%	100	100		

Table 4 shows the highest incidence of Salmonella males for females, where the number of males infected 90 (75.55%) and the number of infected 68 (24.45%) and a no significant difference under the level of () The researcher¹³ The majority of donors infected with Salmonella are males and the number (198) and the proportion (99%) This is consistent with the results of the current study.

As shown in Table 5, the percentage of infection with Brucella bacteria for males is higher than females where the number of males infected 39 (82%) and the number of infected females 7 by 18%. The difference between females and females was less than males, where females were 7.9% and males 9.2%.

Table (6) shows the percentage of infection with Salmonella where the residues area, where we note that the percentage of donors infected in the city more than in the village where it reached in the city (66) and by 73.33% either in the village has reached the number of donors 2 and the proportion 26.67 Significantly below the NS level.

This table shows the number of donors in the city more generally than in the village was the number of donors in the

Table 6: Distribution of *Salmonella typhi* to residence

			<i>Salmonella</i>		X^2	Sig.
			Negative	Positive		
Residence	Urban	Count	73	66	1.13	0.28 ^{NS}
		%	66.36	73.33		
	Rural	Count	37	24		
		%	33.64	26.67		
	Total	Count	110	90		
		%	100	100		

Table 7: Distribution of *Brucella melitensis* to residence

			<i>Beucella</i>		X^2	Sig.
			Negative	Positive		
Residence	Urban	Count	112	27	0.002	0.96 ^{NS}
		%	75.12	69.2		
	Rural	Count	49	12		
		%	24.88	30.8		
	Total	Count	161	39		
		%	100	100		

city (139). In the village (61) and these results are consistent with the results obtained by the researcher (17) where the incidence of infection in the village (43%) and in the city (57%) This is consistent with the results obtained in the current study.

Table 7 shows the percentage of infection with Brucella, where the number of infected in the city (27) and (69.2%) either in the village has reached the number of infected (12) and (30.8%) This table shows the number of beneficiaries in the city more than in the village where The number of donors in the city (139) either in the village was (61) and a significant difference below the level (NS).

The researcher (17) reported that the incidence rate in villages (71.2%) and the number (334) and in the city (28.01%) and the number (130) This is comparable to the results of the current study where it was in the city (27) and (69.2%) and in the village (12 (30.8%))

CONCLUSIONS

High prevalence of infection with Salmonella typhi more than that of Brucella where the prevalence rate (69%)-(31%) for the two types, respectively. The age group (31-40) is the most susceptible to bacterial infection (40%). The prevalence of salmonella in the city is higher than the village where the incidence of Salmonella in the city (73.33%) and in the village (26.67%). The proportion of infection with Brucella in the city (69%) and in the village (30%)

RECOMMENDATIONS

Doning other laboratory tests such as bacteriological tests, Conduct molecular tests to diagnose species, also interring of this tests for both bacteria Salmonella and *Brucella* within the routine tests to be conducted on the blood of the donor

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