THE EFFECT OF ENVIROMENTAL CONDITIONS ON THE SPREED OF SALMONELLA GERMS IN HUMAN IN THE TIKRIT

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Abstract

Study included nine hundred samples was randomly collected from in patient and out patient in Tikrit teaching hospital, Salahaldin general hospital and dijlla general hospital from November 2012 to August 2013.

Aim of study

1-isolation of salmonella spp from different samples.

2-study of antibiotic sensitivity against salmonella.

The study according to the age period the most common age period was in children (1D-2Y) with higher percentage of infection (26.82%). while in adult age period(20Y-40Y) was higher percentage of infection rate (29.2%), the study revealed the incidence of salmonella infection in female (60.97%) higher than percentage in male (39.2%).

Through seasonal study and according to degree of temperature and months of year study revealed higher percentage of infection was in July 2013 (8.5%) and June 2013 (7.6%) but there was no infection in January 2013 and marked decrease in December 2012 (1.09%).

In comparative study of salmonella infection and type of milk feeding in children there was higher percentage of infection in children who depending artificial milk feeding (63.63 %) comparison to children who depend on natural milk feeding (36.36%).

As percentage of infection according to living and breeders of animals there was higher percentage for who live in rural area (68.29%) comparison to who live in urban area (31.70%) there was high percentage of infection in who breeders of animals (60.97%) from who not breeders of animals (39.02%) . Through study of sensitivity of isolates to antibiotic all (100%) isolates was resistant to Amoxicillin and Ampicillin while higher percentage of isolates (82.92%) were sensitive to ciprofloxacin.

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Introduction

The genus Salmonella of the biggest races family intestinal flora Enterobacteriacea as causing bacteria Salmonella wide range of acute and chronic disease in humans and animals as endemic intestinal tract of the animal and transmitted to humans by eating food contaminated with bacteria [1].

Salmonella disease is common(Zoonosis) (between humans and animals) caused by the bacterium Salmonella a negative bacilli to gram dye and , mostly , except for the two types of mobile S.pullorum, S.gallinarum not be spores , be colonies soft white circular with full edge and a little on the high circles[2].

Remain with salmonella bacteria , Salmonella infection is one of the primary reasons for inflammation of the stomach and intestines in humans and is the type Salmonella typhimurium strains of the important causes of enteric fever , food poisoning and inflammation of the stomach and intestines . [3,4] and is main cause of death in animals and transmitted to humans by eating food and water contaminated by salmonella [5,6].

There are many reasons behind the high prevalence of bacteria on Earth , including , frequent presence , and the diversity of methods of deployment, and the multiplicity of patterns of serum , which led to a big problem for workers in the field of diagnostic patterns germ as well as the increasing strains of antibiotic resistance , which amounted to approximately 2700 serotype resistant to the types of antibiotic.

Spread bacteria Salmonella in the environment , exposing human infection has recorded the control center preventive diseases (CDC) Center for Disease Control & Prevention in the United States up to 40,000 cases of bacteria Salmonella each year more than a third of these infections in children aged less than 5 years And many studies show that the source of this infection due to eating contaminated food or record by people infected with or carriers of the bacterium [7] .

And the lack of an integrated studies about epidemic disease salmonella, especially in Salahuddin province, came this study to shed light on some of the epidemiological factors related to this disease, so this study aimed to the following: -

1 - A study of some epidemiological aspects of Salmonella disease in humans.
2 - To identify the types of salmonella bacteria isolated from patients in the province of Salahuddin.

3 - Study of the sensitivity of Salmonella bacteria isolated from human to some antibiotics.

Materials and methods

Sampling :

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This study was conducted in the city of Tikrit / microbiology laboratory at the Faculty of Medicine / University of Tikrit for the period from November 2012 until august 2013. The study included 900 samples taken from patients and auditors admitted to some hospitals in the city of Tikrit Teaching Hospital , Salahuddin General Hospital , dijla Hospital for Medical Rehabilitation . Samples were taken over different days each month and patients at various pathological condition of different ages and both sexes included specimens from patients three kinds of them , as follows:

1- Isolate Salmonella from blood:

Were collected (300) sample of the blood of patients admitted to the auditors where withdraw 5 ml of blood of adults ranging in age from 15 years and above by syringe sterile and added to 45 ml of infusion heart and brain Brain heart infusion broth and took 1 ml of the children who range in age from month up to 12 years and added to 9 ml of the center itself and the bosom degree of 37 ° C for 24 hours and then quoted a drop of gravy using the carrier metal sterile (Loop) and planted on the middle pea- steel Salmonella-Shigella agar and Central XLD and incubated degree of 37 ° C for 24 hours .

2- Isolate Salmonella from stool:

Were collected (300) sample of faeces of patients admitted to the auditors and different ages and both sexes saluting were taken tinge of stool by swab sterile and then put directly into the broth Tetrathionate broth and incubated degree of 37 ° C for 24 hours and then transferred drop from the middle by the carrier metal sterile (Loop) and planted on the middle pea-steel Salmonella-Shigella agar and Central XLD and incubated at 37 ° for 24 hours .

3- Isolate Salmonella from urine:

Were collected (300) sample of urine are collected from both sexes and different ages have been taking a tinge of urine by Swab sterile and then put directly into the broth Tetrathionate broth and degree of 37 ° C for 24 hours and then transferred drop from the middle by the carrier metal sterile (Loop) and planted on the middle pea-steel Salmonella-Shigella and Central XLD and incubated at 37 ° for 24 hours .

Antibiotic Susceptibility test:

Conducted for sensitivity to antibiotics on Muller-Hinton Agar and the center of Nutritious agar and using tablets antibiotics , as I attended farms germ transfer of a single colony to 5 ml of the center of gravy nutritious Nutrient broth that lap at a temperature 37 ° C for 24 hours . Then flooded a sterile cotton swab in bacterial grown and published on surface of agar and dishes left to dry at room temperature for 15 minutes and then transferred tablets antibiotic to surface of the agar and incubated at a temperature 37 ° C for 24 hours .

RESULTS AND DISCUSSION

ISOLATION:

The results of bacterial isolation The proportion of the total isolation of Salmonella bacteria from patients admitted to the reviewers to some hospitals in the city of Tikrit , amounted to (41) isolation from 900 patient at a rate of (4.55 %).

Was isolated samples positive for fecal (30) sample at a rate (10%) samples and urine were recorded (9) isolates positive and by (3%), while blood samples recorded (2) sample rate (% 0.66) isolation observed (Figure 1).

Have shown the highest rate for the presence of these bacteria in stool samples , followed by urine and then blood and attributed the presence of bacteria salmonella in the stool more than blood and urine , because the incubation period of salmonella from 7-14 days in the blood and then move on to the stool and urine [8].

Salmonella bacteria isolated:

Have been identified species of bacteria isolated, as shown in the table (3-4) and was the type of germ *S. typhimurium* the most common and the number was (23) isolation rate (56.9%), followed by the type of *S. typhi* rate (24.3%) were similar number of isolates of *S. agona* and *S. anatum* (7.31%) and either *S. non serotyped species* was by (4.87%) figure(2).

The results coincided in this study with the researcher [9] as the type *S. typhimurium* is more sovereignty in the species studied. In a study [10] show that the most common type is the type *S.typhimurium* The proportion of insulation (15.6%) and attributed the cause to the large number of injuries poultry , cats , dogs, and that transmits infection turn to the Food Rights [11].

The study agreed [12] with our study where the type is *S. typhimurium* most common species and by (55%) ,followed by Type *S. typhi* rate (20%) The other species were attributed to lower the percentage of *S. anatum* (10%).

While [13] record that the type *S.typhimurium* species were more frequent in the male in the city of Mosul, and at a rate of(34.1 %) of the total isolates , Male[14] in his study that the most defenseless species of rights in the province of Nineveh is the kind *S.typhimurium*.

Isolate the bacteria Salmonella results by age groups:

Were collected samples from different age groups, starting from (1) day and up (80) years, as the results showed the presence of high levels of incidence of bacteria Salmonella has been shown that the rate of infection in children aged (1D-2Y) was(26.82%), while decrease in age 60-80y (2.4%), as shown in the figure(3).

Figure (3) percentages of Salmonella bacteria isolated according to age groups.

This study was compatible with [12], as it showed a high rate of incidence in the age group (1Y-2Y) and by(20 %) while formed the age group of (12Y) and above the proportion (10%) and for the age group (12Y-5Y) the incidence of bacteria Salmonella is (5%), the study showed [14], the high proportion of isolated bacteria salmonella in children in the province of Nineveh, as it was (1.388 %) while the percentage of isolation in adults (0.526 %).

In relationship between the incidence of germ salmonella and age adults study was compatible with [10] Taking the highest rate of infection in the age group (29Y-20Y) where the total (17.3%) was due to these people eating in many places and frequently in restaurants these restaurants may be contaminated and is subject to the terms of health.

this age group whose members are forced to use a lot of antibiotics that may have a direct impact on the presence of Salmonella bacteria isolated.

Isolate the bacteria Salmonella results by gender:

The study results by sex for the samples isolated were collected 472 samples of females and the number of isolates of Salmonella positive for females (25) isolation at a rate (5.29%) than the number of samples females and were collected 428 samples of male and by (47.55%), as shown in the figure(4) ,where the results of the study showed that the infection rate in females is higher than the incidence in males.

It has been shown that the results of the study by sex convergent with the study [12] where it appeared that the incidence of females (29 %), while in males was (15%) have agreed this result with the results of other studies conducted outside the country as a study [15] and as it came to the interpretation of these results did not become clear until now the causes that lead to a higher incidence in females than males and possibly return some of the reasons that females are more vulnerable to infection than males may be due to factors, genetics and immune status and physiological and frequent deal females , especially housewives with domestic animals such as cows , sheep , goats and poultry , particularly the peasants in the villages .

And also coincided current study with the study of each of [16,17], as was the incidence of female higher incidence in males are not in conformity with the study (Ismail , 2005) as the proportion (73.3 %) in males is higher than females (26.8 %).

In a study [18] show that the incidence to be higher in females than in males . And correspond to the results of the study almost with the study carried out by the [19] It was found that the rate of infection in adult females (59%) was higher than the incidence in males(28.3

%) at a hospital Dhulikhed in Nepal as well as agreed with the results of a study carried out by each of Naitik and Upama in 2010 , as the ratio of(71.7%)in male which is higher than females (28.3 %).

While this study differed with the results of a study [12] it was found that the incidence of Salmonella germ higher in males than in females by (65%) males and females by (35 %) .

Results isolate Salmonella bacteria by months of study:

The study showed differing rates of isolated bacteria salmonella according to the different months of study, as recorded the highest percentage to isolate the bacteria salmonella in the month of June by (7.6%) and the month of July by (8.5%), as shown in figure (5) recorded the lowest percentage of isolates of bacteria Salmonella in the month of December and the month of August (1.09%) each, while not registered any infection in the month of January.

And coincided results of our study with the current him [20] as it is consistent with the results of global studies observed the diversification seasonally to infection by bacteria Salmonella , as studies have reported obtaining the highest infection rates in the months with high temperatures, possibly due that salmonella increasing their ability to grow and multiply and spread in hot weather as the human body may respond more to infection during the summer months as well as pollution factors that may increase in this chapter [21].

Results isolate Salmonella bacteria by milk feeding type:

Has been shown by isolating bacteria salmonella in kids between the ages of (2Y-1D) and by type of breast-height ratio insulation for bacteria salmonella in children who are dependent on artificial feeding and the percentage of (63.63%), compared with isolation in children who rely breastfeeding (36.36%). Note (Figure 6).

Attributed the cause of increase in isolates of Salmonella for children who rely on artificial milk feeding result of contamination of bottles and the low level of health awareness among some mothers as it has accused of doing boil water used for feeding and lack of interest in the full and exact level of preparation for baby [22]. In addition, the milk powder may contain salmonella bacteria [23].

Results isolate Salmonella bacteria by housing site:

Through a review of the references show that bacteria Salmonella infection by high housing site in patients who live in villages and stood by (68.29%) while the incidence in patients who live in the city (31.70%) (Figure 7) .

I have agreed this study with the results of previous studies on patients who live in the village and city in the study [24]. where the results showed that the highest rate of injury germ salmonella in who live in villages by (60.5%) of those who live in the city where the incidence (%39.4). And coincided study with [14], where the percentage of infection in patients who live in villages (2.4%), while the incidence of patients who live in cities (0.88%), also differed study results with the results of researcher [25] it is found that incidence in the city more than it is in the village.

Results isolate Salmonella bacteria by animal breeder:

The results showed a higher incidence of salmonella bacteria in patients who breeder animals as percentage of isolation(60.97%) compared with the incidence in patients who to not breeder animals (39.02%). Observed (Figure 8).

May study showed that the percentage of isolates of bacteria Salmonella is higher in people who breeder animals , because most of the feed used as food for animals fish and meat and bone plays an important role in keeping the infection by bacteria salmonella among the animals that may be passed in turn to humans as a result deal with constant animals domesticated they have and care Standing them [26].

Also emphasized research and other studies into the role of animals in the transfer of bacteria Salmonella to humans through their products [27], and agreed this study with [13], where between the incidence of bacteria salmonella have risen at who breed animals as percentage (3.01 %), while the incidence of patients who to not breeder animals (0.69 %) .

Study Salmonella bacteria resistant antibiotics:

Showed most of the isolates under study resistant isolates of salmonella to antibiotics used as results confirmed that all isolates of Salmonella were resistant to each of the Amoxicillin rate (100%) and Ampicillin (100%)and Tetracycline 35 isolation rate (85.36%) and the highest sensitivity of the isolates were bearing all Ciprofloxacin 34 isolation rate (82.92%) and by Table (1).

The results were consistent with several studies In a study[28] show a high resistance to the bacteria Salmonella for Ampicillin and high sensitivity of Ciprofloxacin and this converges with the results [29].

In a study[24] showed high resistance to Amoxicillin in all isolates of Salmonella bacteria and high sensitivity towards the Ciprofloxacin.

Data analysis done by spss statistical program at version 16 with P value $\leq$ 0.05

Conclusions

1 - The study found salmonella bacteria in epidemiological Salahuddin province that bacteria Salmonella infections rate was high .

2 - The results of the study showed that the dominant types of isolates are bacteria *S. typhimurium* and *S. typhi*.

3 - The results showed that the epidemiological factors noticeable effect on the increase in the incidence in terms of age , sex and type of feeding , housing and animal husbandry.

4 - observed the effect of temperature by months of study on the high incidence of salmonella germ .

6 - showed salmonella bacteria isolated in this study are resistant to most antibiotics traded .

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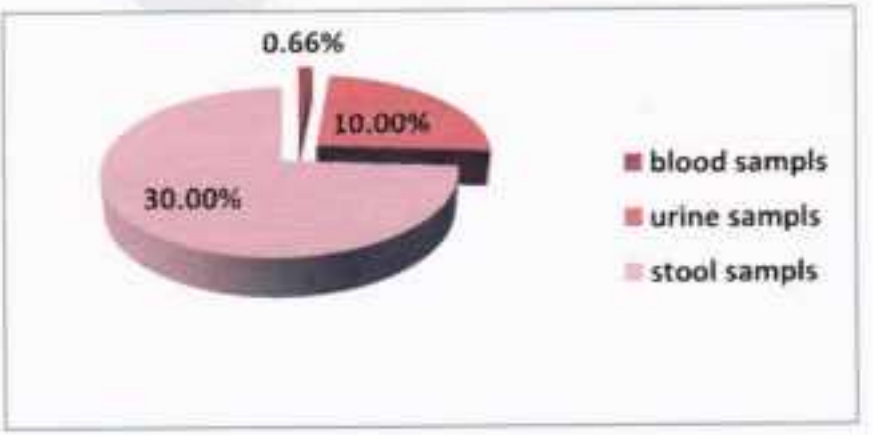
R	I	S	Diameter of inhibition zone(mm)				Antibiotic
			R	I	S		
41	0	0	<13	14-17	>18	Amc	Amoxicillin
41	0	0	<13	14-16	>17	Amp	Ampicillin
27	9	5	<12	13-17	>18	C	Chloramphenicol
4	3	34	<15	16-20	>21	Cip	Ciprofloxacin
24	6	11	<12	13-14	>15	Gm	Gentamicin
22	4	15	<13	14-18	>19	Na	Nalidixic acid
31	1	9	<10	12-14	>15	S	Streptomycin
35	0	6	<11	12-14	>15	Tet	Tetracycline
32	0	9	<10	11-15	>16	Tr	Trimethoprim
30	5	6	<17	18-20	>21	Pip	Pipracillin
Resistant = R Intermediate = I Sensitive = S							

Table (1) the sensitivity of salmonella isolates under study to antibiotics.

Figure (1) distribution of salmonella according to samples .



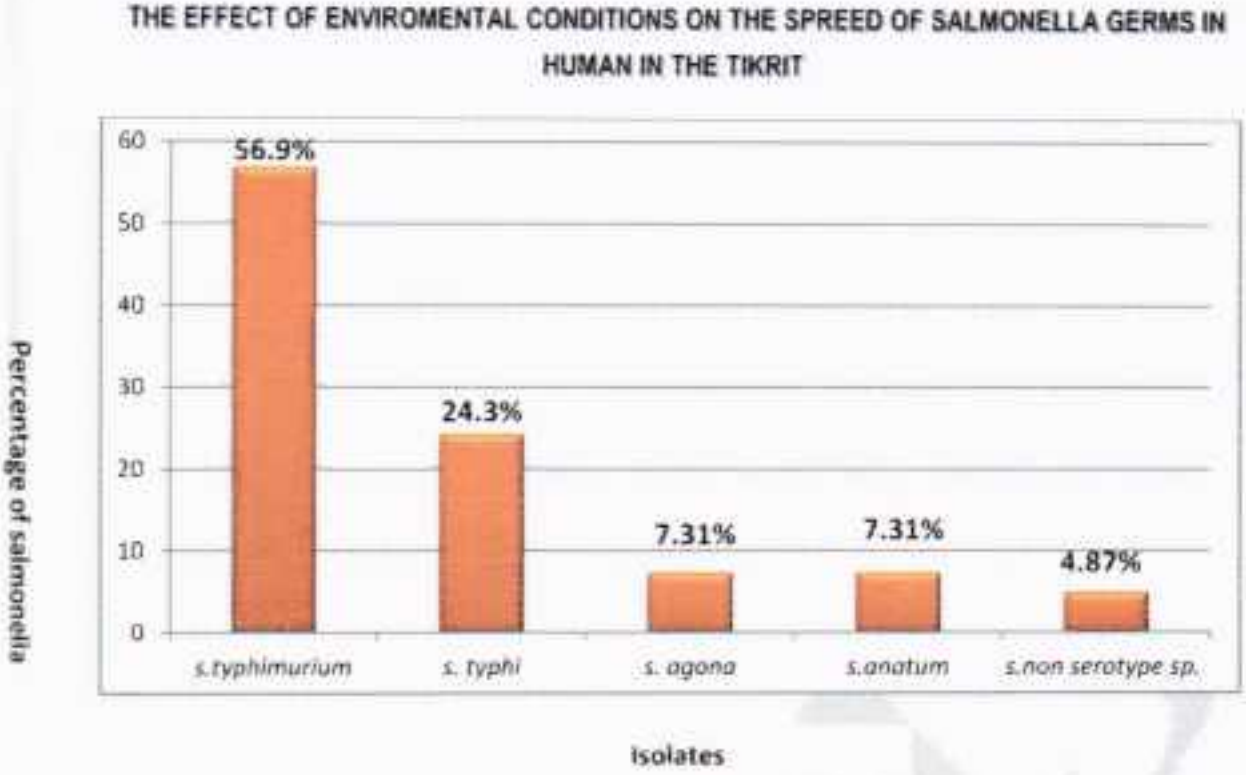
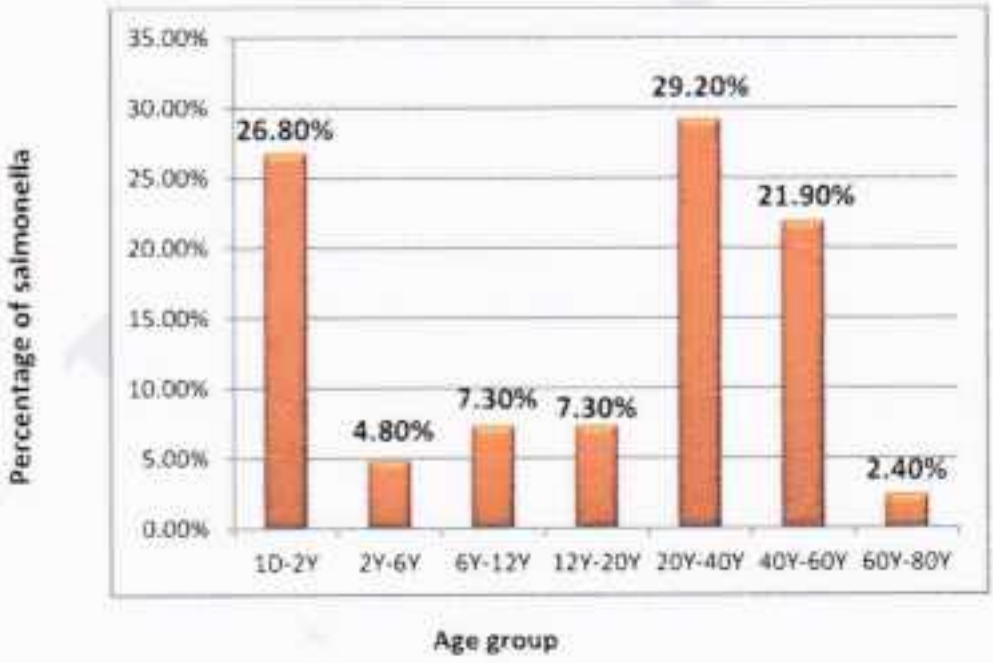
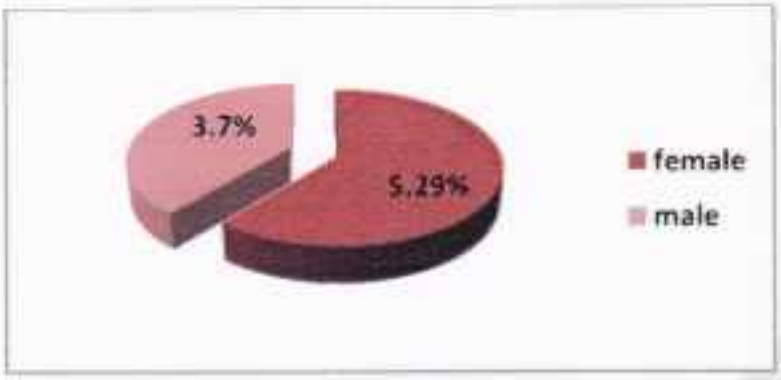


Figure (2) the percentage of Salmonella bacteria isolated patterns.





Figure(4) proportions isolate bacteria Salmonella by sex

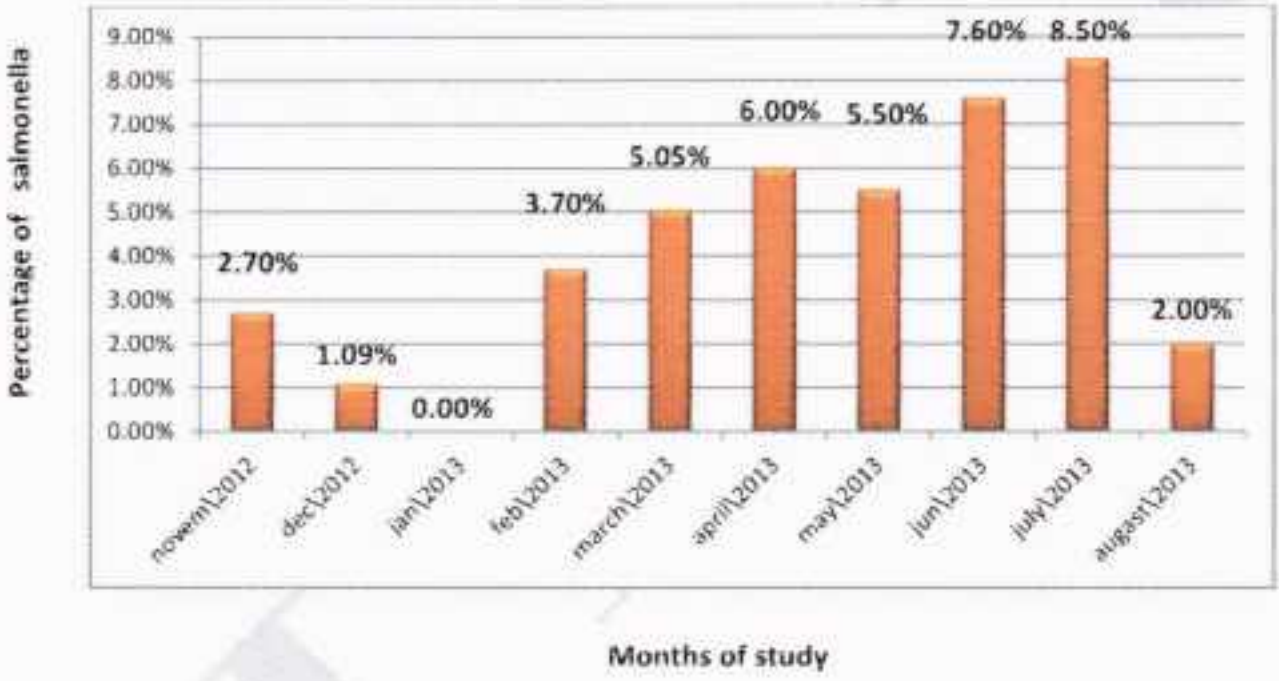


Figure (5) the percentage of Salmonella isolates by months of study.

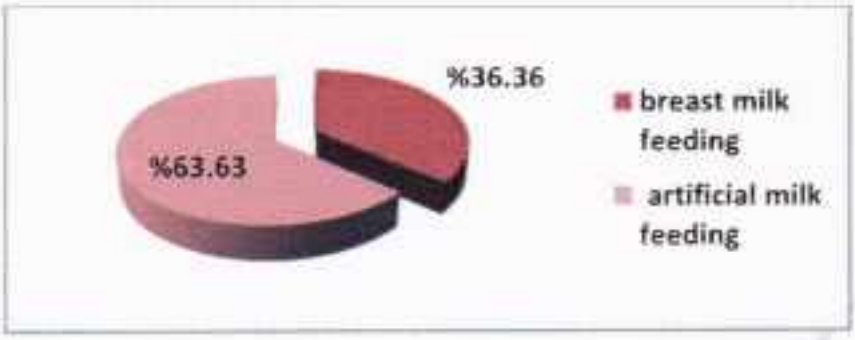
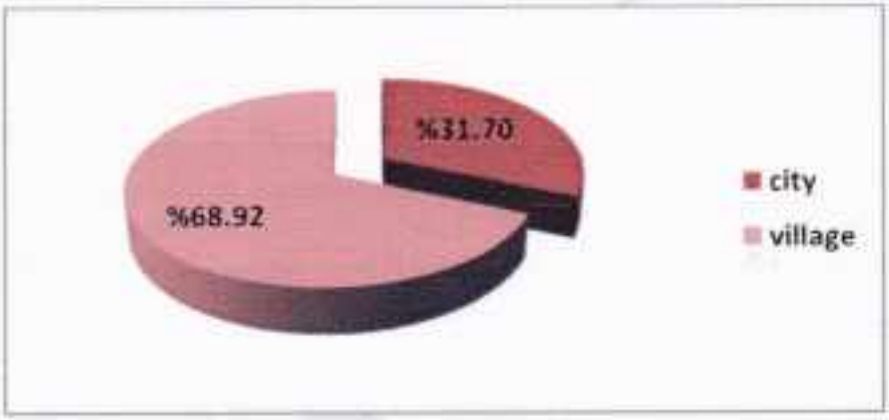


Figure (6) the percentages of isolates of Salmonella bacteria by type of breast-feeding:



(Figure 7), the percentage of isolates of Salmonella bacteria by housing.

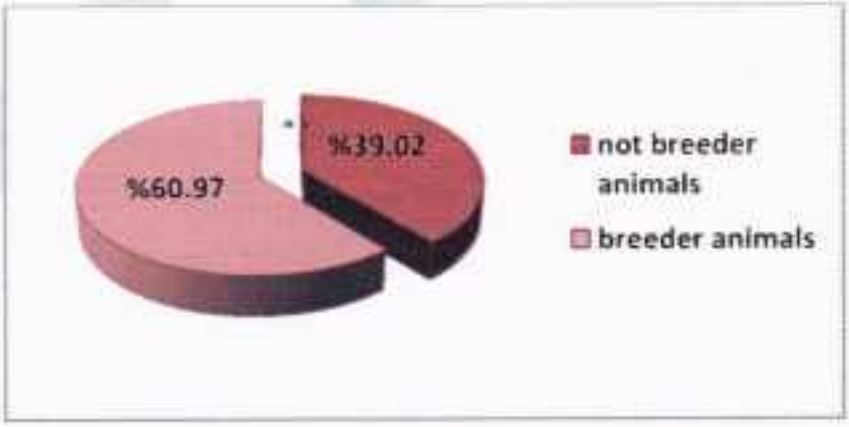


Figure (8) the percentage of the bacteria Salmonella isolates by animal breeder.