Study of Bacteria in Stool and Urine Among Food Handler In Ramadi City

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Abstract:

Back ground: The carrier is a state which follow either symptomatic or asymptomatic *salmonella* infection. It may be temporary or chronic. *Salmonella spp.* can be detected by stool or urine cultures and serologic techniques**.**

Aim of study: Bacteriological study (isolation and identification) of stool and urine among food handler in Ramadi city.

Materials and Methods: One hundred (100) apparently healthy food handlers with no significant past medical history; 75 were restaurant and cafeteria workers while 25 persons were house wives. From each individual two specimens(stool, urine) were taken and inoculated immediately in selenite broth, incubated for 18 hours at 37^{o}c and then sub-cultured on MacConky agar, *Salmonella-Shigella* agar, Xylose-Lysine Deoxycholate agar, and Bismoth sulfite agar plates and they were incubated for 24 to 48 hours at 37^{0} C, a suspected *salmonella spp.* Colonies were identified according it's specialized methods.

Results: The age of the studied individuals ranges from 16-52 years with mean age (27 $\pm$ 8) years . Both urine and stool culture , all of them were negative for salmonella spp. Three specimens ((3%)) of urine showed growth of *E. coli* while seven stool specimen were showing positive culture for other than salmonella organisms, E. coli showing 45% , *Proteus spp.* 30% , *Citrobacter freundii* 15% and *Klebsiella spp* . 10%.

Conclusion: In this study all samples whether stool or urine were negative for *salmonella* species. So studied food handlers individuals were not carriers for salmonella in Ramadi city .

Key words: *Salmonella* infection , Salmonella carriers , Stool sample.

Introduction:

Salmonella is a genus of rod-shaped, Gram-negative, non-spore-forming, predominantly motile enteric bacteria with diameters around 0.7 to 1.5 µm, lengths from 2 to 5 µm, and flagella which grade in all directions (i.e. peritrichous) [1] .

Salmonella organism is facultative intracellular pathogen [2]that enter cells via macropinosomes[3] [4]. *Salmonella spp* can be detected by stool, urine cultures and serologic techniques if cultures of specimens are unknown[5] [6] .*Salmonella* is closely related to *Escherichia* genus and are found worldwide in cold- and warm-blooded animals (including humans), and in the environment, they cause illnesses like typhoid fever, paratyphoid fever, and food borne illness[6] [7] .The microorganisms are transmitted through food products by cross contamination or from healthy carriers who don't wash their hands before preparing food [8] [9].

The organisms mostly enter via the oral rout, usually with contaminated food or drink [10]. After ingestion ,the salmonellae survive the antibacterial defenses of the stomach and small intestine penetrate the gut mucosa through the peyer's patches[11], the bacteria reach the intestinal lymph nodes, where they survive and multiply within macrophages, they are transported in the macrophages to the mesenteric lymph nodes and thence to thoracic duct and are eventually discharged into the bloodstream, in the liver, they multiply in kupffer cell, from the reticuloendothelial system, bacteria re-invade the blood to reach other organs (e.g. kidney) [12] [13] .

The gallbladder is infected either from the blood or from the liver via the biliary tract, the bacterium being particularly resistant to bile, as a result *S. typhi* enters the intestine for a second time in much larger number than on the primary encounter and causes a strong inflammatory response in peyer's patches, leading to ulceration, with the danger of intestinal perforation [14] .

Patients usually continue to excrete *S. typhi* in the feces for several weeks after recovery, and 1-3 % become chronic carriers, which is defined as *S. typhi* excretion in feces or urine for 1 year after infection, chronic carriage is more common in women, in older patient and in those with underlying disease of the gallbladder such as schistosomiasis[15].

This study aimed the isolation and identification of *Salmonella spp*. From food handler.

Materials and Methods :

A total of 100 apparently healthy food handler, 75(75%) persons were restaurants and cafeteria workers while the other 25(25%) persons were house- wives. 40 (40%) persons were cookers, 30 (30 %) individuals were waiters, 5(5 %) were restaurant owners (Figure 1).They were studied during the period from 2nd July /2012 to 3rd August/ 2012.

Urine and stool samples were collected from each individual, these samples were subjected to bacteriological study (10) .

Each stool specimen was inoculated immediately in Selenite broth and incubated for 18 hours at 370C and then sub-cultureed on MacConky agar, Salmonella/Shigella agar, Xylose-Lysine Deoxycholate agar, Bismoth agar plates and they were incubated for 24 to 48 hours at 370 C, the suspected growth of *Salmonella spp* colonies were identified following special methods [16] [17]. Urine specimens were cultuivated soon directly on MacConky agar, Salmonella/Shigella agar, Xylose-Lysine Deoxycholate agar, Bismoth agar plates and

they were incubated for 24 to 48 hours at 370 C following diagnostic methods mentioned for stool isolates following methods of Forb2s *et al*, 2002 [17] .

Bacterial isolates subjected to important test called (IMVC) test, This test includes Indol test, Methyl Red Voges- Proskauer test and Cimmon Citrate used for identification of gram negative bacterial isolates [18]. In short term preservation, bacterial isolates were maintained using intermediate term preservation, bacteria were stored in a medium containing 20% glycerol. This was done by adding 20 ml of sterilized glycerol to 80 ml of sterile brain heart infusion broth and distributed to 5 ml into each screw-capped bottle with full loop from exponential growth of bacteria and left for 30 minutes at room temperature then stored at -20 oC [19].

All bacterial isolates were examined by a biochemical advanced testing system which is a Vitek 2 compact system which is an accurate microbial identifier [20] (Fig-2).

Results :

They were healthy with no significant past medical history. Their age range from was 16-52 years with mean of (27+ 8) of food handlers in (Table-1).

Regarding the results of urine and stool cultures, all stool and urine specimens were negative for *salmonella* species. Three (3) (3%) samples of urine showed growth of ***E. coli*** and all of them were from house wives. Seven (7) specimens of stool cultures were positive for bacteria other than *Salmonella* and these bacteria are , ***E.coli*** 45%, ***Proteus spp***30% , ***Citrobacter freundii*** 15% and for ***Klebsiella spp*** 10% as shown in (Figure -3)

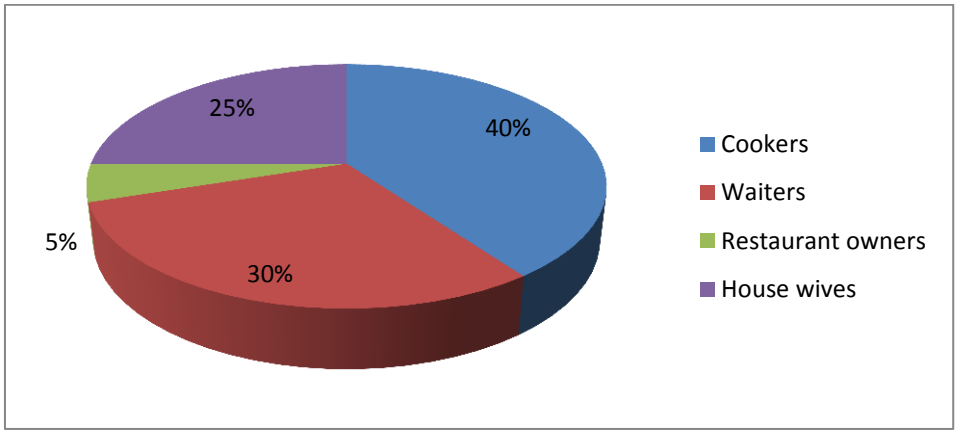

Figure 1: The distribution of the study sample according to Occupation

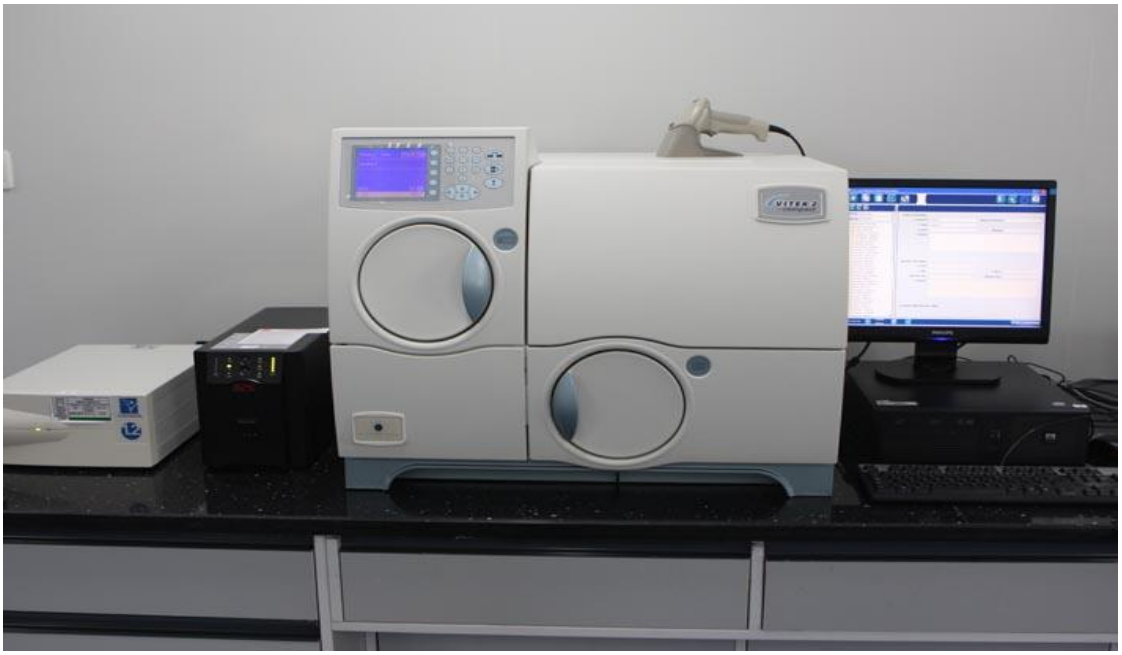

Figure 2: VITEK^{R} 2 compact system.

Table-1: Distribution of patient's ages.

Ages group	Female No.(%)	Male No.(%)	Total No. (%)
15-20	2(2%)	13(13%)	15(15%)
21-25	5(4%)	39(39%)	44(44%)
26-30	4(4%)	13(13%)	17(17%)
31-35	4(4%)	3(3%)	7(7%)
36-40	6(5%)	2(2%)	8(8%)
41-45	4(4%)	2(2%)	6(6%)
46-52	3(3%)	0(0%)	3(3%)
Total No.	28(28%)	72(72%)	100(100%)

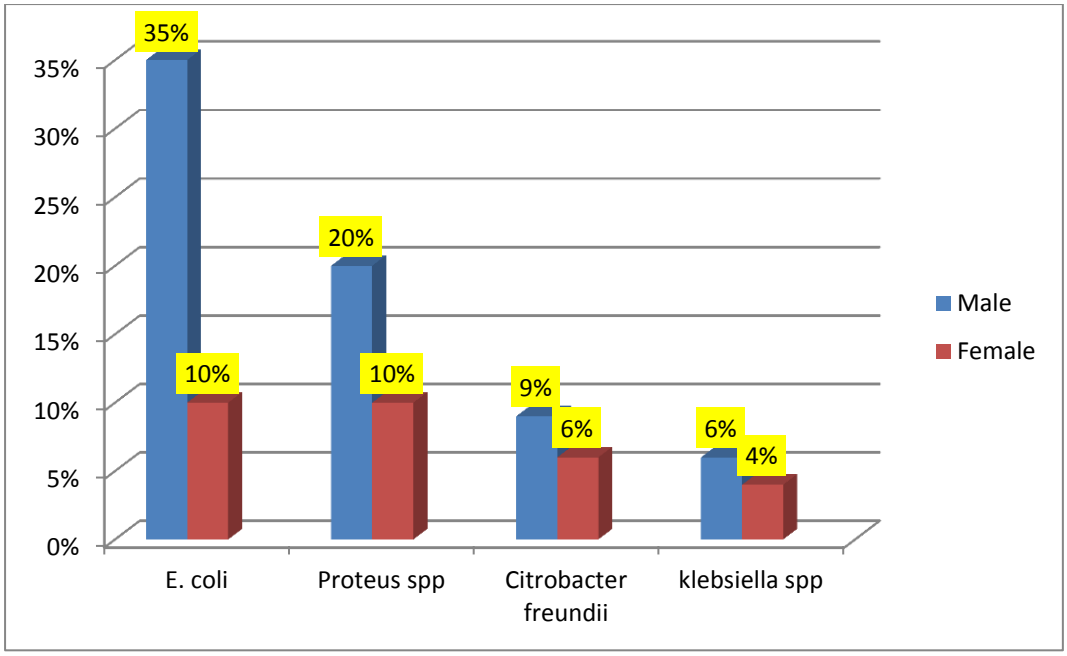

Figure- 3: Distribution of bacterial isolates other than *Salmonella spp* among studied food handlers , stool specimens .

Discussion:

In this study all samples whether stool or urine were negative for *salmonella* species. These results were disagreed with other studies done outside the country. One of these studies was in India to detect asymptomatic typhoid carriers and showed positive stool culture for *Salmonella* in 17.14% ((6/35)) of the healthy food carriers in the sample studied and five isolates were having the multidrug resistant character [21] [22] [23].

Other studies showed wide difference with the current study in the rate of isolation of *salmonella*,one of them was achieved by Smith *et al* 2010 [24] and showed a positive rate near 17% and the study was done in Beiging; Yanping luo *et al* 2009 [25] yielded a positive rate of 9.5% (29/305) and considered healthy food handler as a high risk group for *Salmonella* carrier[26].

The finding of this study was nearly similar to the study which was done in Amritsar city in India which yield only one positive culture (0.47%) among 214 health food handler who were studied [27].

The explanation for negative isolation of salmonella from stool and urine cultures in this study was probably related to the size and quality of the sample studied which is just 100 subjects and most of them males while the carrier state mostly occur in females and probably if the sample larger than this, a positive culture may appear.

Another explanation is the wide and sometimes the abuse of antibiotics in our community since many people use antibiotics neither with medical prescription nor strict marketing policy of pharmacies in Ramadi city and possibly the improvement of hygiene standards among food handler have been achieved in our society.

This study concluded :

1- We can concluded from this study the all samples were negative for *Salmonella species* (stool or urine culture).

2-Isolation of other enteric bacteria rather than *Salmonella* species indicated that selenite broth used here did not show significant inhibition to the stool flora.

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