



Salmonella Sp Isolated from Domestic Animals in Zaria Kaduna

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Abstract

A total number of 459 isolates of *Salmonella spp* were recorded in the bacteriology diagnostic lab of the Veterinary teaching hospital over the period of 10 years, namely 2004 to 2013. Table showing the monthly and yearly distribution of *Salmonella* isolates in the lab from 2004 to 2013. A total of 2135 samples were submitted to the Diagnostic Unit of Department of Veterinary Microbiology of Ahmadu Bello University Zaria and out of which 83 (3.89%) were positive for *Salmonella* species. Seasonal frequencies of the organism isolated by year and months showed that month of June has the highest frequency of sample (238) and highest *Salmonella* isolates (11). The months of March 2013 and 2013 also August 2009 have no samples recorded probably due to industrial actions. The prevalence rate of 3.9% was recorded for *Salmonella* species and there was significant difference in the frequencies variation with years ($p < 0.05$) depicted the concurrent isolates from different sample and animal species. This further shows that there may be possibility of co-infection with other organisms. Pus and wound swabs (38) were the samples with the most isolated *Salmonella* and swabs from canine was most frequent. *Salmonella* may be transmitted to man through eating contaminated foods and water. There is need for good hygiene and sanitary measure in the environment.

Keywords: *Salmonella*; Bacteria; Enterobacteriaceae; Diarrhea

Introduction

Salmonella is group of bacteria known to cause diseases in both humans and animals. *Salmonella* can infect cold blooded animals and are readily isolated in the environment due to fecal contamination. They also cause diseases like food poisoning, paratyphoid and typhoid fever. *Salmonella* are rod-shaped gram-negative bacterium belonging to the family Enterobacteriaceae. *Salmonella* are non-spore-forming, predominantly motile with peritrichous flagella Fabrega, et al. [1] *S. Pullorum* and *S. Gallinarum*, et al. [2] mostly isolated in poultry, are non-motile. It is the causative agent of salmonellosis which is a gastrointestinal infection. *Salmonella* are facultative intracellular pathogens with two recognized species only namely: *Salmonella bongori* and *Salmonella enteritica*. Reptiles, such as turtles, lizards, and snakes, may carry *Salmonella bongori* in their intestines which can cause intestinal infections. There are six main subspecies of *Salmonella enteritica* which mainly infect warm blooded vertebrates: *Salmonella enterica* (I), *Salmonella salamae* (II), *Salmonella arizonae* (IIIa), *Salmonella diarizonae* (IIIb), *Salmonella houtenae* (IV), and *Salmonella indica* (VI) Janda, et al. [3] *Salmonella* is further divided into numerous serovars which are subspecies based on antigens produced by the organisms. Based on the type of disease and organisms they affect, *Salmonella* serovars can be divided into two main groups: Typhoidal [4] *salmonella* serovars: these are not very common and are adapted to humans and higher primates. They do not occur in other animal's e.g. *Salmonella* paratyphi and *Salmonella typhi*. Non-typhoidal *salmonella* serovars: these are very common and cause self-limiting gastrointestinal infections. They can infect animals, are found in their gastrointestinal tract and are ubiquitous in the environment. They are zoonotic. *Salmonellosis* has been recognized in all countries, but appears to be most prevalent in areas of intensive animal husbandry, especially of poultry or pigs (OIE, 2010). In humans, *salmonellosis* is a very common infection. Infections are usually contracted from sources such as: poultry, pork, beef [5] and fish (seafood), if the meat is prepared incorrectly or is infected with the bacteria after preparation, infected eggs, egg products, and milk when not prepared, handled, or refrigerated properly, tainted fruits and vegetables (FDA/CFSAN). Most people infected with *Salmonella* develop diarrhoea, fever, vomiting, and abdominal cramps 12 to 72 hours after infection. In

most cases, the illness lasts four to seven days, and most people recover without treatment (Food safety.gov). In some cases, the diarrhea may be so severe that the patient becomes dangerously dehydrated and must be hospitalized. Serious illness that can lead to death in humans usually occurs only in children, the elderly and the immuno-compromised.

Materials and Methods

Record books from the laboratory archives were used to gather data on the samples brought to the lab. Record books from the period of 2004 to 2013 were reviewed. The area covered for this study was Zaria, Kaduna State. The data collected was then arranged in tabular form.

Results and Discussion

A total number of 459 isolates of *Salmonella spp* were recorded in the bacteriology diagnostic lab of the Veterinary teaching hospital over the period of 10 years (2004 to 2013). Below is a Table 1 showing the monthly and yearly distribution of *Salmonella* isolates in the lab from 2004 to 2013. From the records there were isolates from both animal and non-animal sources. The non-animal sources were feed and water while animal sources included chicken, turkey and dog. The Table 2 below represents the data from each of the different sources. The samples brought to the lab from the different sources above were of various types. The Table 3 below shows the sample distribution. In the entire ten years only one antibiotic sensitivity test was requested for a sample which was a liver sample from a chicken. The most isolated species of *Salmonella* was *Salmonella pullorum*.

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Table 1: The yearly and monthly distribution of the number of salmonella isolated from 2004 to 2013 in zaria.

Month/year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
January	2	1	-	3	6	10	9	6	2	4	43
February	-	1	-	2	9	4	6	1	1	2	26
March	-	5	-	1	13	12	7	2	1	-	41
April	-	-	-	4	5	6	12	2	1	1	31
May	-	-	2	2	16	10	5	2	-	4	41
June	-	1	5	1	11	9	12	1	-	4	44
July	1	1	8	4	12	4	6	1	5	4	46
August	3	1	4	12	6	-	8	3	6	3	46
September	3	1	1	6	6	-	5	4	2	4	32
October	-	1	-	9	5	5	6	2	2	1	31
November	1	-	1	7	4	5	2	3	6	3	32
December	3	2	9	9	4	6	6	1	3	3	46
Total	13	14	30	60	97	71	84	28	29	33	459

Table 2: A table showing the various sources of lab samples.

Sources of samples	No. of samples
Chicken	450
Water	3
Feed	2
Turkey	2
Dog	2
Total	459

Table 3: A table showing the various samples brought to the lab and their distribution.

Sample	Number
Liver	419
Spleen	20
Gallbladder	1
Yolksac	6
Mouth swab	1
Heart	1
Lung	2
Ovarian follicle	4
Water	3
Feed	2
Total	459

There was 1 *Salmonella enteritidis* isolate and 2 *Salmonella gallinarum* isolates. From the results obtained it was clear to see that *Salmonella* is a major pathogen of chickens [6] in Zaria. *Salmonella* is known to be of increasing significance in the poultry industry especially with improved breeds and genetic breakthroughs and in poultry production and also increased infections. *Salmonellosis* in poultry causes heavy economic loss through mortality and reduced production Khan et al [7] *Salmonella* was isolated all through the period of 2004 to 2014 and in all the months of the year (Figure 1). This agrees in part with the study carried out by to determine the prevalence and seasonality of *Salmonella* isolations from commercial poultry in a retrospective analysis of laboratory-confirmed cases of avian *salmonellosis* conducted from 2006-2010 records of poultry diseases reported in Zaria, Nigeria. They concluded that avian *salmonellosis* occurs throughout the year with the highest incidence being during the rainy season. A similar retrospective study was carried out by Mbuko, et al. [8] Looking at the yearly distribution, the highest number of isolates was gotten between the years 2007 to 2010, with the highest number of isolates from samples sent to the lab occurring in 2008. Isolates were lowest in 2005 and 2006. After 2010, the isolates of 2011 to 2013 were significantly lower. The low numbers isolated from 2005 to 2006 maybe due in part to the avian

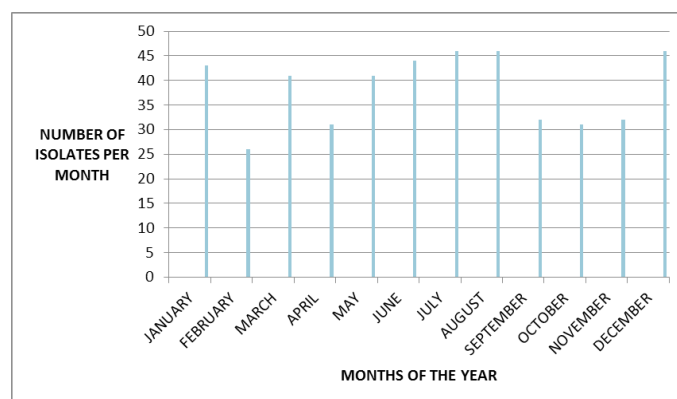


Figure 1: Monthly distribution of number of isolates from 2004 to 2014.

influenza outbreak which occurred during this period. Many poultry farms were not functional at this time for fear of contacting the virus and this was one of the lowest periods for the poultry industry generally in Nigeria. The surge in isolates from 2007 to 2010 was a period of revival in the poultry industry when the avian flu outbreak had been somewhat contained in Nigeria. Also it was a time that saw a marked increase in the number of improved commercial and backyard poultry farms in the Nigeria. Some of these new developments in the poultry industry included improved breeds and systems of management. The largest sample sent for isolation of salmonella was the liver of chickens. This may be because of the large number of isolates which can be found in the liver which agrees somewhat with work done by Sujatha, et al. [9] Chickens and poultry in general are known to be major global reservoirs of salmonella. The list of samples sent to the lab show that *Salmonella* can be isolated from a variety of sources. This can be due to fecal contamination as mentioned earlier. It also shows that sources of salmonella infection are varied. It also shows that *Salmonella spp* can be found in a variety of organs, though the best organ for diagnosis in chickens remains the liver. From this, we can conclude that *Salmonella* species in the bacteriology diagnostic lab of the veterinary teaching hospital is mainly isolated from liver sample of chickens and that the liver of the chicken is the preferred sample for tentative diagnosis of *Salmonella spp* in chickens in the lab.

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