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ISOLATION AND IDENTIFICATION OF *SALMONELLA SPP* FROM POULTRY MEAT SAMPLES

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ABSTRACT

Background: *Poultry meat is a key source of contamination with Salmonella spp., which is the main cause of food-borne illness globally. Poultry is a major reservoir of salmonella infection and according to the CDC Salmonella is responsible for around one to two million annual cases of salmonellosis in the united state.*

Objective: *To determine the prevalence of salmonella spp in poultry meat samples collected from different areas of district Swat*

Methodology: *Our research study was conducted at the department of microbiology in government degree collage madyan swat from 05/11/2023to 05/05/2024. We collect the poultry meat samples in sterile polythene bags. A total of 120 poultry meat samples were collected from different chicken shops. All the samples were chopped by sterilized blades. Samples were enriched in buffered peptone water and then cultured on salmonella and shigella agar. All the culture positive samples were identified by microscopy and biochemical testing. All the data was collected in a pre-designed proforma. Data analysis was done by using SPSS version 24.*

Results: *In the current study, a total of 120 meat samples from poultry shops of different areas of district Swat were process for the isolation and identification of salmonella spp. Out of 120 samples the salmonella spp positive samples were 60 (50%) while 60 (50%) samples were negative for salmonella spp. Thus the overall prevalence of salmonella spp in our study was 50%.*

Conclusion: *Our study concludes that salmonella spp. is highly prevalent in poultry meat. Our study suggests the molecular level detection of salmonella associated with the poultry meat. The present research highlights the need of using appropriate storage, handling, and cooking techniques to avoid food-borne disease due to salmonella. The findings also emphasize the need for continued surveillance and implementation of effective interventions to reduce the risk of Salmonella contamination in poultry meat.*

Key words: *Salmonella, poultry meat, food safety, CDC, Pathogens, Detection, Identification, Isolation, public health*

INTRODUCTION

Poultry meat is common source of animal protein, harbors food-borne illnesses that can infect people (1). Poultry meat in Pakistan accounts for 26.8 percent of the overall meat produced in the country. The total

amount of poultry meat produced in 2011–2012 was 834000 tons, while in 2012–2013 it reached 907000 tons (2). Worldwide, there are between 12 and 27 million cases of typhoid fever each year (3). Similar to other meat varieties, chicken meat is prone to quality degradation as it has a short shelf life and is very perishable, even when kept in a cold environment. Meat safety may be increased and meat quality can be preserved by lowering the temperature (4). This is achieved by delaying the growth of bacteria and chemical processes. Poultry ranked first as cause in food poisoning with an incidence of 29.32%, followed by meat and cream with an incidence of 15.33 and 8.78%, respectively. In the world, the most prevalent food-borne bacterial disease is salmonellosis, often known as enteric fever or paratyphoid. Acute enteritis, chronic enteritis, and septicemias are the three main clinical syndromes associated with this infectious disease that affects both humans and animals. It is caused by the Salmonella species S. enterica and S. bongori (5). One of the most common food-borne illness causes is salmonella spp. Approximately 93 million cases of colitis and 155,000 deaths occur due to Salmonella that is not typhoidal yearly in the world. Foodborne illness was suspected in 80.3 million of these cases (6). Salmonella has rod shape and is facultative anerobic microorganisms. Salmonellosis is one of the most common food-borne illnesses that represent a major concern to public health worldwide (7). As a result of decreased productivity and high mortality, salmonella infection is one of the most significant bacterial illnesses affecting poultry (8). The two pathogenic types of Salmonella that infect birds most frequently are Salmonella enterica a subspecies enterica serovar Gallinarum biovar Gallinarum (S. Gallinarum), causing fowl typhoid and destroys many birds of every generation, and The bacteria Salmonella enterica subspecies enterica serovar Gallinarum biovar Pullorum (S. Pullorum), which leads pullorum illness and kills a large number of young birds—possibly up to 100 percent—in their first 2 to 3 weeks of life, Adults who contract it by vertical transmission frequently have chronic infection (9, 10). The most serious form of salmonellosis for humans is typhoid fever, which is still a major problem in developing countries, mainly due to the lack of sanitation and hygiene standards (11). The disease is transmitted mainly via foodstuff and water contaminated with the pathogen, and it affects more than 90 million people worldwide yearly, with variable morbidity and mortality rates (12). Annually, there are around 100 million cases of salmonellosis recorded globally, leading to 160,000 fatalities. About 100,000 confirmed cases of human salmonellosis were recorded in the EU in 2015, with 126 fatalities (13). ssSamonella spp is one the prevalent bacteria in poultry meat but in our area there is no such study on the prevalence of salmonella spp in poultry meat samples. Therefore this study was carried out to determine the prevalence of salmonella spp from poultry meat samples in different regions of district Swat**.**

Material and methods

Our research study was conducted at the department of microbiology in government degree collage madyan swat from 05/11/2023 to 05/05/2024. A total of 120 poultry meat samples were collected from different chicken shops. The samples were collected from different areas of district swat including Madyan, Bahrain, khwazakhela, Matta. We collect the poultry meat samples in sterile polythene bags. All the samples were labeled properly and transported to the laboratory of microbiology, GDC Madyan Swat. All the samples were chopped by sterilized blades. Samples were enriched in buffered peptone water and then cultured on salmonella and shigella agar and then incubated at 37°C for 24-48 hours. All the culture positive samples were identified by microscopy and biochemical testing. All the data was collected in a pre-designed proforma. Data analysis was done by using SPSS version 24.

Results

In the current study, a total of 120 meat samples from poultry shops of different areas of district Swat were process for the isolation and identification of salmonella spp. The distribution of samples based on areas of district Swat is given in Figure 1. Out of 120 samples the salmonella spp positive samples were 60 (50%) while 60 (50%) samples were negative for salmonella spp. Thus the overall prevalence of salmonella spp in our study was 50%. (Figure 2) The area wise distribution of salmonella positive sample is given in figure 3.

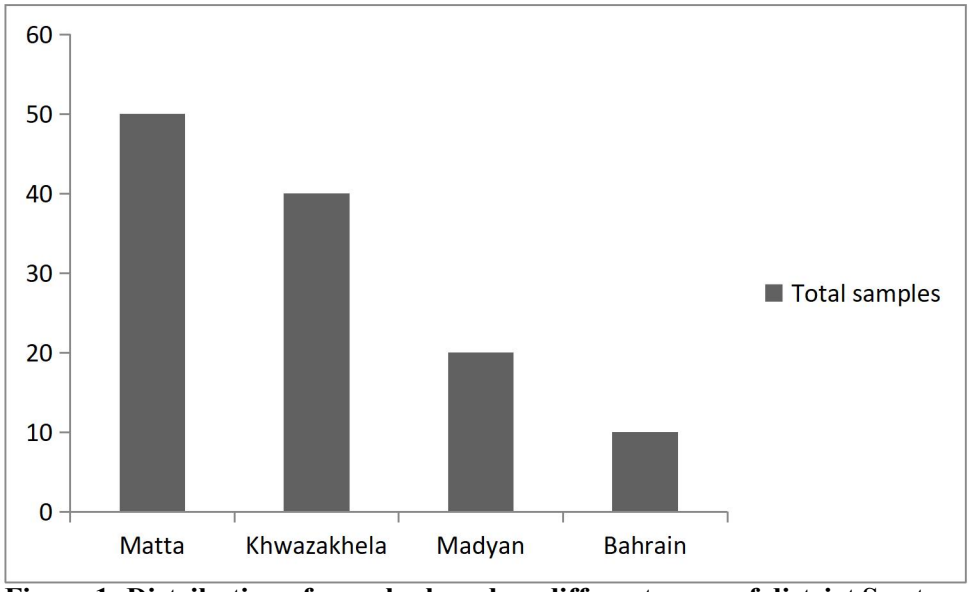

Figure 1: Distribution of samples based on different areas of district Swat

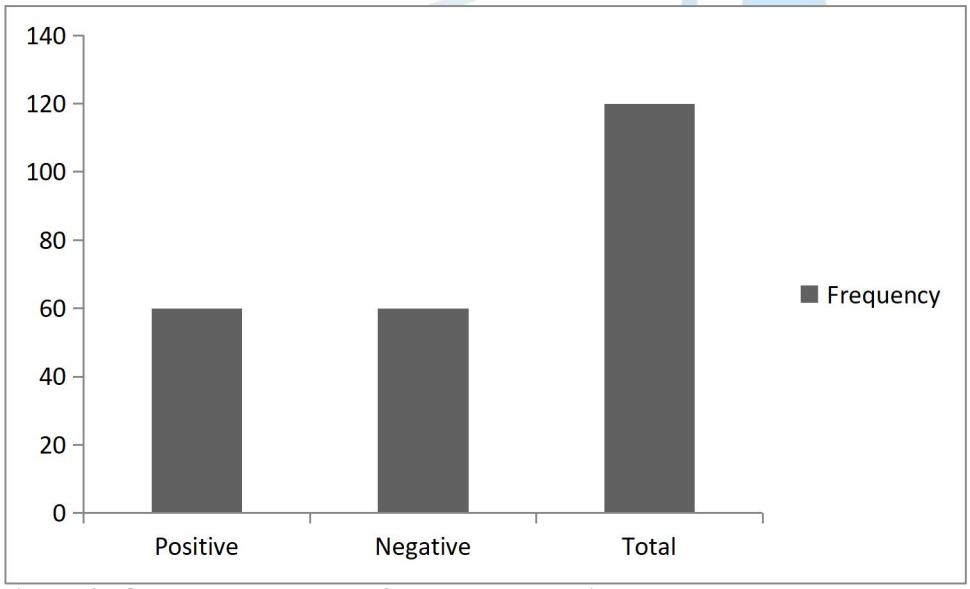

Figure 2: Overall prevalence of salmonella spp in our study

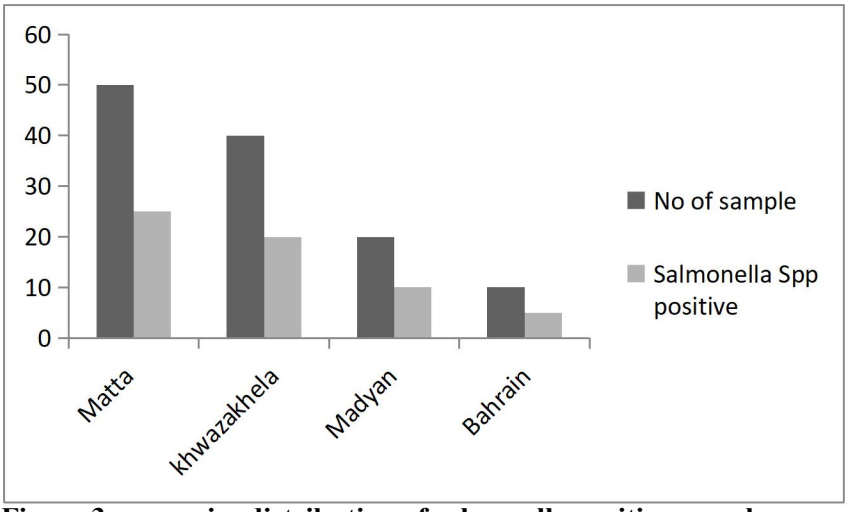

Figure 3: area wise distribution of salmonella positive sample

Discussion

The goal of the current study was to examine the prevalence, range, and persistence of Salmonella sp. in various food samples utilizing the findings of affordable microscopic, cultural, and biochemical assays. Salmonellosis is a major medical concern in the food business and is regarded as one of the important zoonotic diseases (14). According to a previous study, poultry is the most common cause of Salmonella in food-associated illness in humans. To guarantee the identification of the transmission of zoonosis and determine its prevalence in humans, examination of chicken meat for Salmonella spp. should be supervised by Public Health and Veterinary Authorities. This would strengthen preventive measures and reduce the contamination of poultry products. A wide range of materials can support the growth of Salmonella. As the incidence of human salmonellosis rises, a "farm to fork" approach is recognized as being crucial to limit infections, and Good Manufacturing Practices (GMPs) employing Hazard Analysis Critical Control Point (HACCP) principles are increasingly employed to accomplish a reduction (15).

A comprehensive grasp of the infection's epidemiology and a customized control plan for every distinct unit are essential for preventing salmonella infections. Human food poisoning and ovarian infections are caused by Salmonella enteritidis. One of the most common causes of food-borne diseases is Salmonella food poisoning (16). On the perspective of public health, the safety and shelf life of poultry meat continue to be key concerns. In order to lower Salmonella spp. and spoilage bacteria in the chicken meat, poultry processors must assess several antimicrobial alternatives and determine their efficacy for their process.

In Pakistan's Swat poultry meat is a valued commodity for the local customer. Salmonellosis, both typhoidal and non-typhoidal, is a serious foodborne illness that poses a threat to global health in many regions. Common pathogenic bacteria, Salmonella spp., are linked to a variety of foods, including meat, meat products, chicken, and poultry products.

Out of the 120 samples we collected from various SWAT areas, 60 (50%) were positive for salmonella spp. A previous study from Pakistan reported lower prevalence of salmonella spp (25.75%) in comparison to our study (17). A previous study done in Colombia also reported lower prevalence (37.14%) as compared to our study (18). Other studies reported high prevalence of salmonella than our findings (19, 20).

In addition, the conversation makes one worry about how common Salmonella will become in the future. Variations in infection rates have been reported in earlier research from other nations, suggesting that this is a worldwide issue that requires international attention. Cooperation among nations can facilitate the exchange of information, resources, and best practices for the efficient fight against Salmonella and other infections. Salmonella was found to be prevalent in broiler chicken in Sri Lanka (11.6%), but other studies have found higher prevalences—36.5% in Belgium (20), 35.8% in Spain 35.5% in Malaysia (21), 34% in Turkey, and 39.5% in Greece (29). Furthermore, Malaysian broiler chicken meat has been found to have a

higher prevalence of Salmonella (88.5%) (22). Salmonella has also been found to be the most common pathogen in broiler chicken meat in South Africa (23).

Conclusion

Our study concludes that salmonella spp. is highly prevalent in poultry meat. Our study suggests the molecular level detection of salmonella associated with the poultry meat. The present research highlights the need of using appropriate storage, handling, and cooking techniques to avoid foodborne disease due to salmonella. The findings also emphasize the need for continued surveillance and implementation of effective interventions to reduce the risk of Salmonella contamination in poultry meat.

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