

# Isolation and Antibiotic Susceptibility Profile of *Salmonella* spp. from Patients in a Tertiary Care Hospital in Thailand

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**Objective:** The impact of COVID-19 on the number and antibiogram profile of *Salmonella* was studied between January 2018 and December 2021. The present time period included years before the COVID-19 pandemic, which are 2018 and 2019, and during the pandemic, which are 2020 and 2021.

**Materials and Methods:** *Salmonella* infections were classified into eight distinct serogroups using slide agglutination with specific antisera (A, B, C, D, E, F, G, and I). The susceptibility to antimicrobial agents were evaluated by the standard disk diffusion method.

**Results:** Four hundred fifty-one isolates were detected (139 in 2018, 119 in 2019, 102 in 2021, and 91 in 2021). *Salmonella* infection decreased by 25.2% from 258 isolates in 2018 and 2019 to 193 in 2020 and 2021. When comparing *Salmonella* infections in different age groups (0 to 10, 11 to 20, 21 to 30, 31 to 40, 41 to 50, 51 to 60, 61 to 70, and older than 70 years), before and during COVID-19, statistical significance was noted only in patients aged 11 to 20 ( $p=0.016$ ). For clinical specimens (stool, blood, urine, pus, etc.), statistical significance was found only in blood specimens ( $p=0.036$ ). The four most predominant *Salmonella* serogroups were B (31.1%), C (30.6%), E (15.7%), and D (11.4%). *S. Typhi* was present in 2.1% (4/193) of *Salmonella* isolates during COVID-19. The findings of a susceptibility test using the disk diffusion method for four commonly used drugs in treatment of severe salmonellosis as ampicillin, cefotaxime, ciprofloxacin, trimethoprim/sulfamethoxazole, before and during COVID-19 demonstrated statistical significance only in *Salmonella* serogroup D ( $p=0.028$ ). Overall, drug susceptibility of *Salmonella* serogroup B, C, D, and E was ampicillin (range 15.1% to 55.9%), cefotaxime (range 66.7% to 100%), ciprofloxacin (range 18.8% to 59.1%), and trimethoprim/sulfamethoxazole (range 70.0% to 93.8%).

**Conclusion:** The present study results suggested the importance of monitoring the prevalence of *Salmonella* at a hospital in Bangkok. The antibiogram of susceptibility helps provide guidelines for clinician to consider empirical treatment.

**Keywords:** *Salmonella*; COVID-19 pandemic; Thailand

Received 10 October 2022 | Revised 4 December 2022 | Accepted 14 December 2022

J Med Assoc Thai 2023;106(2):200-6

Website: <http://www.jmatonline.com>

*Salmonella* is responsible for causing two diseases known as salmonellosis, which is enteric fever (typhoid) resulting from bacterial invasion of the bloodstream, and acute gastroenteritis, resulting from foodborne infection. The Centers for Disease Control and Prevention (CDC) estimates

*Salmonella* causes about 1.35 million infections, 26,500 hospitalizations, and 420 deaths in USA every year<sup>(1)</sup>. Drug-resistant *Salmonella* have been reported in many countries<sup>(2,3)</sup>.

The COVID-19 pandemic is a new, severe respiratory disease and a major worldwide public health burden. The disease is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which originated in Wuhan, Hubei Province, China in December 2019 and rapidly spread throughout China<sup>(4)</sup>. In February 2020, the World Health Organization (WHO) announced that the disease caused by a novel coronavirus would be named coronavirus disease 2019 (COVID-19). In March 2020, the WHO declared COVID-19 a global health emergency, leading to an enormous impact on the healthcare system<sup>(5)</sup>.

The authors related the *Salmonella* infection

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## How to cite this article:

Chongtrakool P, Wangleotsakulchai P, Tabboon T, Thuncharoon H, Pummangura C, Samretwit D, et al. Isolation and Antibiotic Susceptibility Profile of *Salmonella* spp. from Patients in a Tertiary Care Hospital in Thailand. J Med Assoc Thai 2023;106:200-6.

DOI: 10.35755/jmedassocthai.2023.02.13784