

# Symptoms and Laboratory Findings of Patients Diagnosed with Typhoid Fever at the Time of Admission into the Health Service Facility

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## Abstract

Typhoid fever is a systemic infection caused by the Gram-negative bacillus *Salmonella typhi*. Typhoid fever spreads through food or drink contaminated with *S.typhii*. Diagnosis is established through anamnesis, physical examination and laboratory assessment. Aims of this study are to identify the frequent symptoms and the results of laboratory assessment of patients diagnosed with typhoid fever. Medical records of adult, male and female patients diagnosed with typhoid fever in the year 2016 and with Immunoglobuline-G anti Salmonella Test Score 4 - 6, enrolled in this study. Medical records used as a source of information of complaints, vital signs, and clinical laboratory results at the time of admission. Some of the most frequent complaints were fever, followed by nausea, headache, vomit, diarrhea or loose stool. Fourteen (82.4% of total) patients presented with fever, fever with relative bradycardia covered 12 (70.6% of total patients). Immunoglobuline-G (Ig-G) anti Salmonella test score 4-5 (positive indication) were more frequent than score  $\geq 6$  (strong indication of typhoid fever). Leucocyte count  $<5000/uL$  covered 29.4% of patient. Thrombocyte count  $<100.000 /uL$  covered 17.6%. The most frequent complaints at the time of admission were fever, followed by nausea, headache, vomit, diarrhea or loose stool. This study found relative bradycardia and bicytopenia, and positive indication of Ig-G anti Salmonella Test Score were more frequent than strong indication of typhoid fever.

**Keywords:** typhoid fever; symptoms; admission; Ig-G anti-Salmonella

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## 1. Introduction

Typhoid fever is a systemic infection caused by the Gram-negative bacterium *Salmonella typhi* and occasionally by *Salmonella paratyphi*. Typhoid fever spreads through food or drink contaminated with *S.typhi*. Complications and death may follow the disease. The correct nomenclature for the causal agent of typhoid fever is *Salmonella typhi* [1]. Prompt diagnosis and appropriate treatment is necessary. Diagnosis is established through history of disease physical examination and laboratory examination.

According to previous study, the high incidence of typhoid fever ( $> 100 / 100,000$  cases / year) covers South-Central Asia and Southeast Asia. Region with moderate incidence ( $10-100 / 100,000$  cases / year) covering other Asian regions, Africa, Latin America and the Caribbean, Oceania, except Australia and New Zealand. Europe, North America, other developing regions have low incidence ( $<10 / 100,000$  cases / year). It is estimated that typhoid fever caused 21,650,974 morbidities and 216,510 deaths during 2000 [2]. After adjusting for water-related risk, the estimated rate of burden caused by typhoid fever at Low-Income and Middle-Income Countries in 2010, was 11.9 million (95% CI 9.9 - 14.7) cases with 129,000 (75,000 - 208 000) deaths [3]. Intestinal perforation is one of the most serious complications of typhoid fever. A research on gastrointestinal perforation secondary in suspected typhoid fever found that *S.typhi* was isolated from 41%, and 15% had positive cultures from gut biopsies [4].

Conducted in health facility in Medan, this study aimed to identify the frequent symptoms and the results of laboratory assessment of patients diagnosed with typhoid fever.

## 2. Materials and Methods

All patients who were diagnosed with typhoid fever during the year 2016 and with Ig-G anti Salmonella Test Score 4 - 6, were enrolled in this study. The patients comprised of adult patients, male and female. Medical record is used as a source of information of major complaint, vital signs during admission, and clinical laboratory examination results. All complaints submitted by the patient at the time of admission are recorded in the medical record, and all were included in the history of this study. Normal range of the laboratory results was defined by local laboratory in Medan. Normally distributed data expressed as mean  $\pm$  SD. Data not normally distributed is reported as median (min-max range). This study was conducted after the approval of ethical clearance given by faculty of medicine.

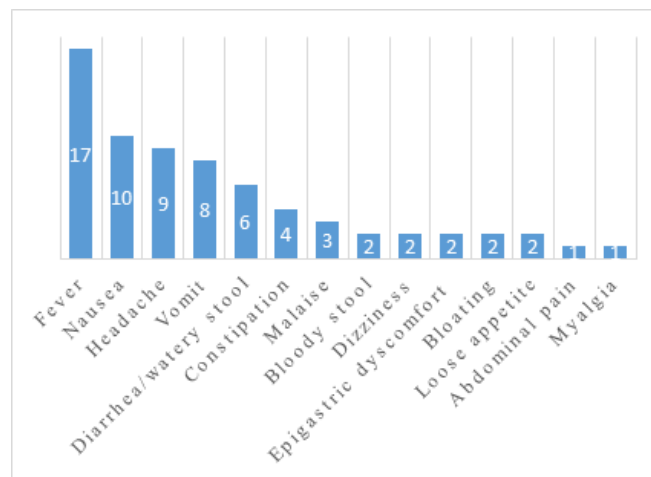
## 3. Results

A total of 17 patients with typhoid fever who met the inclusion criteria and enrolled in the study. Table 1 below show baseline characteristic of those patients, including their vital signs. Age range from 21 to 59 year old. Enrolled patients consisted of male (10, 58.7%) and female (7, 41.2%). This study enrolled patients with Ig-G anti Salmonella score range from 4 to 6 or more. Fifteen patients scored from 4 to 5, and 2 patients scored 6 at the time of admission.

**Table 1:** Baseline characteristic of subjects at the time of admission.

Characteristic	Value (n = 17 )
Sex M, F (n, % of total)	10 (58.7% of total), 7 (41.2% of total)
Age group	
- 17 - 25 yr (n, % of total)	6 (35.3% )
- 26 - 25 yr (n, % of total)	6 (35.3%)
- 36 - 45 yr (n, % of total)	4 (23.5%)
- 56 - 65 yr (n, % of total)	1 (5.9% )
Age (yr (min - max))	32 (21-59)
Immunoglobuline-G anti Salmonella test score	
- 4 - 5	15
- $\geq 6$	2
Vital signs	
- Systolic blood pressure, (mmHg)	110.00 (80 - 150)
- Diastolic blood pressure (mmHg)	70.00 (50 - 93)
- Heart rate ( beats/ min )	86 (76-122)
- Temperature at admission ( °C )	38.60 $\pm$ 1.16
Fever (n, % of total)	14 (82.4% )
No fever (n, % of total)	3 (17.6%)
Fever with relative bradycardia (n, % of total)	12 (70.6%)
Fever without relative bradycardia (n, % of total)	2 (11.8%)

Fever were found in 14 patients (82.4% of total), and fever with relative bradycardia covered 12 (70.6% of total) patients.

**Figure 1:** Complaints reported by patients at the time of admission.

Relative bradycardia as a characteristic feature of specific disease was found for typhoid fever ( $P$  0.003) [5]. The most frequent complaints submitted at the time of admission were fever (all patients), followed by nausea, headache, vomit, diarrhea, constipation and malaise (Figure 1). Complaints were reported as combination. This study results is different from results of study conducted in Jakarta which found that headache, epigastric pain, nausea, decreased appetite and fever in the evening, night time, with normal / descending leucocytes count, as well as abnormal liver function, as the most common clinical symptom found in typhoid [6]. In this study, data

on risk factors were not included, unlike research conducted in Jakarta- Indonesia which found risk factors of typhoid and paratyphoid fever were mainly household (typhoid) and outside the household (paratyphoid) [7].

**Table 2:** Laboratory test results at admission

Laboratory	
Haemoglobin (g/dL)	13.15 ± 1.87
Leucocyte (count /uL)	6923.53 ± 3439.57
Thrombocytes count	154411.76 ± 75509.98
Neutrophyl, segment (%)	78 (55-91)
Lymphocytes (%)	17 (7-40)
Monocyte (%)	2 (1-10)
Hematocrit (%)	39.06 ± 4.96
Score of Ig-M anti <i>Salmonella typhi</i> test(range)	4 - 6

Score of Ig-M anti *S.typhi* test range from 4 to 6 in this study (table 2). The patients then separated according to their scores (Table 3).

**Table 3:** Laboratory test results in patient according to Ig-M anti *S.typhi* test

	Ig-M anti <i>Salmonella typhi</i> test		sign
	Positive indication (score 4-5)	Strong indication (score 6)	
Hemoglobin (g/dL)	13.35 ± 1.89	11.65 ± 0.92	ns
Leucocyte (/uL)	6946.67 ± 3650.61	6750.00 ± 1626.35	ns
Thrombocyte (/uL)	143600.00 ± 71426.09	235500.00 ± 70003.57	ns
Hematocrite (%)	39.47 ± 5.14	36.00 ± 1.41	ns

Hemoglobin levels, leucocyte and thrombocyte counts is shown in Table 2, and Table 3 shows that the difference are not significant between patients with different Ig.M anti *S.typhi* test score.

**Table 4:** Bicytopenia, low leucocyte count and thrombocyte count found at admission

	count	% of total
Leucocyte Count < 5000 /uL	5	29.4 %
Thrombocyte Count < 100000 /uL	3	17.6 %
Bicytopenia	2	11.8 %

The results of leucocytes and thrombocytes counts are vary greatly (in Table 2 and Table 3), and the presence of leucopenia, and thrombocytopenia, are not found in all patients (Table 4). One case of typhoid fever with bicytopenia including leucopenia and thrombocytopenia had been reported previously, with a patient who experienced low leucocyte count (3,700/uL) and low thrombocyte count (5,000/uL) at time of admission [8]. Apparently, this study also demonstrated low leucocyte and low thrombocyte count were 29.4% and 17.6% of total patients, consecutively. Bicytopenia were found in 2 patients (11.8%).

Various presentations of typhoid fever, the timing of the symptoms and host response may vary. Classic typhoid fever syndrome and atypical manifestations should be considered in different timing of illness, acute or chronicity of the disease, geographic region, race factors, age, and the infecting bacterial strain [1].

In developing countries, the diagnosis of typhoid fever is usually made from clinical data including history of illness, physical examination, routine blood tests, liver function test, and blood culture. Cultures have been made from skin snips of rose spots, urine culture and intestinal secretion. The sensitivity of stool culture depends on the amount of faeces cultured. Positivity rate increased with duration of illness [9]. The causative organism for typhoid fever is *S.typhi*. The bacterium is serologically positive for lipopolysaccharide antigens O9 and O12, protein flagellar antigen Hd, and polysaccharide capsular antigen Vi. The Vi capsular antigen is largely restricted to *S.typhi* [9].

Due to the low cost, Widal test becomes the test of choice in many developing countries. The classic Widal test detects agglutinating antibodies to the O and H antigens of *S.enterica* serotype *typhi*. This bacteria shares these antigens with other salmonella serotypes and shares these cross-reacting epitopes with other *Enterobacteraceae*. This can lead to false negative results [9].

As most hospitals and health centres without facilities for culture, a rapid dipstick assay for the detection of *Salmonella typhi*-specific IgM is used in our health care facility. The sensitivity of the dipstick assay was 69.8% when compared with bone marrow culture and 86.5% when compared with blood culture. The specificity for suspected typhoid fever cases but with negative culture result was calculated to be 88.8% [10].

New diagnostic tools able to detect IgM anti *Salmonella typhi* known as Tubex-TF test. This test performed better than Widal test in both sensitivity and specificity [9], [11]. The diagnostic accuracy of this test is moderate [11]. Immunoglobuline-M anti *S.typhi* test or Tubex TF was used because it is a rapid test that useful for the rapid diagnosis of *S.typhi* infection [12] at the time of patient admission into the health care facility. Health service facility where this study was conducted using anamnestic history of disease, physical examination and vital signs, laboratory tests and Ig-M anti *S.typhi* test to establish typhoid diagnosis.

## Conclusions.

The most frequent complaints at the time of admission were fever, followed by nausea, headache, vomit, diarrhea or loose stool. Relative bradycardia and bicytopenia were also found. Immunoglobulin-G anti Salmonella Test Score resulted as positive indication were more frequent than strong indication of typhoid fever.

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