

**STUDY OF BASELINE WIDAL TITRE AMONGST APPARENTLY HEALTHY INDIVIDUALS  
IN AND AROUND MUZAFFARNAGAR CITY OF UTTARPRADESH, INDIA****<sup>1</sup>\*DR. SAPNA CHAUHAN AND <sup>2</sup>MR. SACHIN SHARMA***<sup>1</sup>\*Assistant Professor, Department of Microbiology, Muzaffarnagar medical college, Ghasipura, Muzaffarnagar, U.P. India, 251203**<sup>2</sup> Demonstrator, Department of Microbiology, Muzaffarnagar medical college, Ghasipura, Muzaffarnagar, U.P. India, 251203***ABSTRACT**

Typhoid fever remains a very important public health problem in developing countries like India. It is endemic in almost all parts of India. Widal test is widely used for its diagnosis; however there are several limitations to the test. The interpretation of the single Widal test depends upon the baseline titre prevalent amongst healthy individuals in a particular geographical area. Hence the study was undertaken to determine the baseline Widal titre from the apparently healthy population in and around Muzaffarnagar city of Uttarpradesh, India. Blood samples were collected from healthy volunteers over the period March 2015 to May 2015. All of these were analyzed for the presence of Salmonella antibodies by carrying out Widal tube agglutination test. Among 250 serum specimens which were tested 142(56.8%) sera were found to be positive for the Widal test and 108(43.2%) were negative. The most frequently recorded titre of the reactive sera was 1:80 for the anti-O antibodies and it was 1:80 for the anti-H antibodies against Salmonella typhi while 1:20 for Salmonella paratyphi A & B. This is baseline titre for this region. Our results suggest that 80 for anti-O antibodies, 80 for anti-H antibodies, 20 for anti-AH and anti-BH antibodies may be considered as diagnostic for Typhoid fever in this region.

**KEYWORDS:** Typhoid fever, Endemic, Tube Widal Test, Baseline titre, Salmonella.**DR. SAPNA CHAUHAN**Assistant Professor, Department of Microbiology, Muzaffarnagar medical  
College, Ghasipura, Muzaffarnagar, U.P. India, 251203

## INTRODUCTION

Food and water borne illnesses are a serious problem in developing countries. Poor sanitation, over-crowding, poverty and poor water supply all contribute to the problem. Typhoid fever is such a disease which is endemic in almost all parts of India. The definitive diagnosis of typhoid fever depends upon the isolation of *Salmonella* from blood, urine, stool and bonemarrow<sup>1</sup>. However culture facilities are costly, time consuming and limited to teaching institutions. Hence serological diagnosis by Widal Test becomes important. Widal test was developed by Georges Fernard Isidore Widal in 1896. Here antibodies against the O and H antigens of *Salmonella typhi* and against the H antigens of *Salmonella paratyphi A* and B are detected. However a single Widal test always carries a risk of wrong interpretation as a fourfold rise in titres are required for confirmation which is difficult to obtain as clinicians almost always prescribe antibiotics to patient prior to the test<sup>2</sup>. Hence, a baseline titre is mandatory for interpretation of a single Widal test. Baseline titres vary with geographical areas depends upon the endemicity of the disease<sup>3,4</sup>. So to serve this purpose this study was carried out to determine the baseline Widal titre amongst apparently healthy population in and around Muzaffarnagar city of Uttarpradesh, India.

## MATERIALS AND METHODS

The study was conducted in the Department of Microbiology, Muzaffarnagar Medical College, Muzaffarnagar. After duly explaining about the study a written consent was taken and those with age groups from 18-50 years were included in the study. Individuals with history of fever and those with vaccination against typhoid fever were excluded from the study. A total of 250 healthy volunteers were screened for antibodies to *Salmonella typhi* and *Salmonella paratyphi A & B* by tube Widal agglutination test. Widal tube test kit commercially available (Span Diagnostics Ltd.) was used. Serum samples after doubling dilution in 0.9% normal saline were tested by adding an equal amount of antigen. The tubes were then incubated overnight at 37 °C in a water bath. The results were interpreted as per standard guidelines. Controls were put with each batch of the tests.

## RESULTS

A total of 250 serum samples were screened for the agglutinins against the *Salmonella enterica* subspecies enteric serotypes Typhi, Paratyphi A and Paratyphi B by using the tube Widal agglutination test. Out of 250, 131 (52.4%) were females and 119 (47.6%) were males. Maximum patients were in the age group of 25-30 years (63.9%). 142 (56.8%) samples were positive for the agglutinins ( $\geq 1:20$ ) whereas 108 (43.2%) samples did not show agglutinins ( $< 1:20$ ) [Table:1]

**Table 1**  
**Distribution of samples for Widal test**

Widal Test result	Number	Percentage
Positive ( $\geq 1:20$ )	142	56.8%
Negative ( $< 1:20$ )	108	43.2%
Total	250	100%

Antibodies to the anti-O antigen was seen in 134 (53.6%) samples, antibodies to the anti-H antigen in 142 (56.3%) samples, to the anti-AH antigen in 08 (03.2%) samples and to the anti-BH antigen in 03 (01.2%) samples. [Table:2]

**Table 2**  
**Distribution of samples with Antibody titre  $> 1:20$  against different serotypes of *Salmonella***

Widal Test result	Anti O	Anti H	Anti AH	Anti BH
Positive no.	134	142	08	03
Percentage	53.6%	56.8%	03.2%	01.2%

The distribution of 134 samples with the anti-O titre of  $\geq 1:20$  to the *Salmonella enterica* serotype Typhi showed that 07 (2.8%) samples had titre of 1:20, 46 (18.4%) samples had a titre of 1:40, 75 (30%) samples had titre of 1:80 while only 05 (2%) and 01 (0.4%) samples had a titre of 1:160 and 1:320 respectively. Similarly, among the 142 samples with the anti-H titre of  $\geq 1:20$  to the *Salmonella enterica* serotype Typhi showed that 06 (2.4%) samples had titre of

1:20, 52 (20.8%) samples had a titre of 1:40, 77 (30.8%) samples had titre of 1:80 while only 04 (1.6%) and 03 (1.2%) samples had a titre of 1:160 and 1:320 respectively. Out of 08 samples with the anti-AH titre of  $\geq 1:20$  to the *Salmonella enterica* serotype Paratyphi A, 06 (2.4%) samples had titre of 1:20 and 02 (0.8%) samples of titre 1:40. Only 03 samples (1.2%) had an anti-H titre of  $\geq 1:20$  for the *Salmonella enterica* serotype Paratyphi B. [Table: 3]

**Table 3**  
**Number and percentage of sera with end titres in healthy volunteers**

Dilutions	Anti O (%)	Anti H (%)	Anti AH (%)	Anti BH (%)
1:20	07(02.8)	06(02.4)	06(02.4)	03(01.2)
1:40	46(18.4)	52(20.8)	02(00.8)	Nil
1:80	75(30.0)	77(30.8)	Nil	Nil
1:160	05(02.0)	04(01.6)	Nil	Nil
1:320	01(00.4)	03(01.2)	Nil	Nil

## DISCUSSION

This study was conducted to know the baseline titre of agglutinins against *Salmonella typhi* and *Salmonella paratyphi* A & B. To best of our knowledge no previous study has been undertaken to know the Baseline titre of Muzaffarnagar region. Knowledge of Baseline titre will enable local recommendation for the interpretation of the Widal test results. The most frequently recorded titre for O agglutinin (30%) was found to be 1:80 and for H agglutinin (30.8%) 1:80 of *Salmonella typhi*. For H

agglutinins of *Salmonella paratyphi* A & B most frequently recorded titre was 1:20. Thus the baseline titre for the O, H, A H and BH *Salmonella* agglutinins were assumed to be 1:80, 1:80, 1:20 and 1:20 respectively. Baseline titre is subjected to several variations, depending upon the geographical area and hygienic conditions of the region as evident from the Table 4<sup>5-14</sup>. Poor health and sanitary conditions may be responsible for high titres in our study which is in accordance to other studies from nearby areas.

**Table 4**  
**Comparative analysis of Baseline titre of O and H agglutinins in different regions of India**

Authors	Place	Year	Baseline Titre			
			TO	TH	AH	BH
Punia JM et al <sup>5</sup>	Chandigarh	2003	1:80	1:160	1:20	1:20
Patil AM et al <sup>6</sup>	Karnataka	2007	1:80	1:80	1:40	1:40
Sneha AJ <sup>7</sup>	Pondicherry	2011	1:80	1:80	1:40	1:40
Peshattiwari P <sup>8</sup>	Andhra Pradesh	2011	1:80	1:80	1:40	1:20
Pal S et al <sup>9</sup>	Srinagar(Garhwal)	2011	1:40	1:80	1:20	1:20
Kataria VK et al <sup>10</sup>	Dehradun city	2012	1:80	1:80	1:40	1:40
Saxena et al <sup>11</sup>	Hadoti region(Rajasthan)	2012	1:40	1:40	1:20	1:20
Mittal G et al <sup>12</sup>	Uttarakhand	2013	1:40	1:80	1:20	1:20
Sreenath K et al <sup>13</sup>	Kollam	2014	1:40	1:40	1:20	1:20
Vadsmiya et al <sup>14</sup>	Ahmedabad	2014	1:40	1:40	1:20	1:20
Present Study	Muzaffarnagar city	2015	1:80	1:80	1:20	1:20

## CONCLUSION

In endemic areas like India Widal test has a significant diagnostic value provided proper interpretation of the test is done which is possible only once baseline titres are

known. The baseline titres of our region is 1:80 for anti-O antibodies, 1:80 for anti-H antibodies, 1:20 for anti-AH antibodies and 1:20 for anti-BH antibodies. Any titres above this should be considered diagnostic for Typhoid fever in this region.

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