

# PREVALENCE OF TYPHOID FEVER IN RURAL COMMUNITIES OF NORTHERN LUCKNOW, UTTAR PRADESH- A PROSPECTIVE STUDY



## Medical Science

KEYWORDS : FNA, Liver, US, HCC,  
Cytology

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### ABSTRACT

**Background:** Typhoid fever has been virtually eliminated from the advanced countries during the last several decades mainly as a result of improvements in water supply and sanitation but it continues to be endemic in the developing countries. It is endemic in most parts of India. Overcrowding, poor sanitation contributes to the spread of infection. So early diagnosis is very effective for prevention and management of disease.

**Material & methods:** A total of 1188 clinically suspected typhoid fever patients from rural areas were included in our prospective study. Blood sample was collected and processed by semi-quantitative slide agglutination Widal test.

**Results:** Out of 1188 total blood samples 382 (32.15%) were positive and 806 (67.8%) samples were negative. Out of total 382 (32.15%) positive cases 126 (23.68%) were male and 256 (39.02%) were female patients.

**Conclusion:** This study shows prevalence rate of 32.15%, which is suggestive of decreased sanitation awareness, lack of personal hygiene, improper drinking water supply and poor health education

### Introduction

Typhoid fever, also known as enteric fever is caused by the Gram negative bacterium *Salmonella enterica* serovar Typhi. The disease is mainly associated with low socio-economic status and poor hygiene, with human beings the only natural host and reservoir of infection (Mweu and English 2008). Widal a serological diagnosis test for enteric fever was founded in 1896 by Georges Fernand Isidore Widal (Rao and P.N 2009). It is an agglutination reaction demonstrating the presence of lipopolysaccharide (LPS) somatic (O) and flagella (H) agglutinins to *Salmonella Typhi* in the serum of a patient using suspensions of O and H antigens (Tupasi 1991). The recommended method of performing the widal test is by the tube agglutination technique where serial two-fold dilutions of the subject's serum from 1:20 to 1:1280 are tested (Lunette et. al 1985). Nowadays a rapid slide test is most commonly used technique in local laboratories and hospitals because of its convenience. The widal test has been used extensively in the serodiagnosis of typhoid fever and so remains the only practical test available in most developing countries (Kulkarni et.al 1994). Isolation of *Salmonella typhi* from the blood, faeces, urine, bone marrow, or other body fluids is also an important diagnostic tool. In addition, unavailability of microbiological facilities and the long waiting time for culture results have been identified as reasons for the preference for the widal test (Cheashbrough 1998). A drawback of widal test is cross-reactivity due to which some other bacteria of same genus may produce false positive results, so the positive results must be correlated clinically before prescribing any medicine. Typhidot is another rapid test used to ascertain the diagnosis of typhoid fever, but not as cost effective as widal. So widal test is the choice for typhoid fever especially in rural area.

### MATERIALS AND METHODS

#### Study area and period:

The prospective study was carried out in Hind institute of

medical sciences, Mau, Ataria, Sitapur over a period of 6 months from October 2015 to March 2016.

#### Widal test:

##### Blood Sample Collection-

Peripheral venous blood from all the typhoid suspected patients was drawn and allowed to coagulate at room temperature for 30-45 min, followed by centrifugation at X2500 g for 5 min.

*Salmonella* antigens suspensions are commercially available in 5 ml amounts from Span diagnostic pvt. Ltd. Qualitative slide agglutination and semi quantitative slide agglutination (titration) were performed using stained antigen kits of *Salmonella Typhi* (Span diagnostic pvt. Ltd).

#### Screening Analysis -

The Sera for Widal test were collected from fresh blood samples by centrifugation. Using a Himedia micropipette, 50 µl of each serum were transferred onto six rings on a white tile. The *Salmonella* antigen (1 drop) reagent 'O' 'H' 'AH' 'BH' one positive control, one negative control was also dropped into the rings respectively. Both were thoroughly mixed using an applicator stick and the tile gently swirled for one minute for visible agglutination. The reacting antigens were recorded positive (+) while nonreactive antigens were negative (-).

#### Semi quantitative method-

The positive screening tests for widal was confirmed by semi quantitative method. Fresh titre plates available in the kit were used for semi quantitative method. 80µl (corresponding to the titer of 1:20), 40µl (corresponding to the titer of 1:40), 20µl (corresponding to the titer of 1:80), 10µl (corresponding to the titer of 1:160), and 5µl (corresponding to the titer of 1:320) of undiluted serum were dispensed in respective circles using calibrated micropipette. One drop of appropriate antigen suspension

was added to each circle and mixed using separate stick and rotated for one minute to take the readings. The whole process was followed as recommended by the manufacturer. Quality control was done using the positive control sera available in the kit of the same dilutions as the test sample. Normal saline was used for a negative control. Positive titre was considered to be equal to or above 1:80 for 'O' antigen and 1:160 for 'H' antigen.

**Table 1: Positivity rate of Widal test**

Test	Total cases	Positive	(%)	Negative	(%)
Widal test	1188	382	32.15	806	67.8

**Table 2: Gender wise distribution of positive and negative cases of widal test.**

Gender	Total cases	Positive	(%)	Negative	(%)
Male	532	126	23.68	406	76.31
Female	656	256	39.02	400	60.97

**Table 2: Age wise distribution of positive cases of widal test.**

Age	Total cases	Positive cases	Percentage (%)
≤10	131	22	16.7
11-20	294	104	35.4
21-30	240	90	37.5
31-40	192	61	31.8
41-50	158	58	36.7
51-60	148	43	29.0
≥60	25	04	16.0

**Table 3: Monthly distribution of positive cases.**

Month	Total cases	Positive	Percentage (%)
October	270	50	18.51
November	178	50	28.08
December	174	84	48.27
January	136	60	44.11
February	162	44	27.16
March	328	94	28.65

**Table 4: Distribution of samples with antibody titer slide Widal test against different serotypes among 1188 clinically suspected cases.**

Tpes of Widal test	1:20	1:40	1:80	1:160	1:320
Antibody titers against 'O' antigen of S. typhi Slide test	402	294	130	310	52
Antibody titers against 'H' antigen of S. typhi Slide test	556	226	24	329	53

#### Result :

A total of 1188 clinically suspected typhoid fever cases were included in the study out of 1188 cases, 382 (32.15%) were positive, of which 126 (23.68%) were male patients & 256 (34.02%) were female patients. The male female ratio was 1:2. The present study included all the age groups, the highest positive cases were seen in the age group of 21-30 years (37.5%) followed up by 41-50 years (36.7%), 11-20 years (35.37%), 31-40 years (31.77%), 51-60 years (29%),

≤ 10 years (16.7%) with lowest cases in age group of ≥60 years (16%).

In the present study the highest positive cases were seen in December month 84 (48.27%) followed up by January 60 (44.11%), March 94 (28.65%), November 50 (28.08), February 44 (27.16%) and least in October 50 (18.51%).

In the present study of the total 1188 suspected cases, 52 (4.3%) patients were positive with 1:320 antibody titer against 'O' antigen of S. Typhi slide test followed up by 310 (26.09%) with 1:160 antibody titer and 130 (10.94%) were positive with 1:80 antibody titer against 'O' antigen of S.Typhi slide test. Similarly, 53 (4.4%) patient were positive with 1:320 antibody titre against 'H' antigen of S.Typhi slide test followed up by 329 (27.69%) with 1:160 antibody titre against 'H' antigen.

#### Discussion:

Isolation of the causative agent by culture has remained the gold standard for diagnosis of typhoid fever. Blood culture has got its limited diagnostic utility due to low sensitivity. Although the widal test has been used for more than a century in many developing countries but it is non-specific, poorly standardized, often confusing and difficult to interpret (Schroeder 1968). Moreover, sharing of O and H antigens by other Salmonella serotypes and other members of Enterobacteriaceae makes the role of widal test even more controversial in diagnosing typhoid fever (Parry et. al 2002).

A total of 1188 clinically suspected typhoid fever cases were included in the study out of 1188 cases, 382 (32.15%) were positive, of which 126 (23.68%) were male patients, 256 (34.02%) were female patients. One of the reasons for this high rate of seropositivity against serotype Typhi is the widespread presence of Salmonella infections in the community. The other factors for the sero-epidemiologic data are the cross-reactivity of serotype Typhi antigens with other Salmonella infections and the longevity of these antibodies in the serum (Parry et. al 1999). Due to the rapid growth in population, inadequate human waste disposal, limited water supply and overburdened health care systems have made all disease difficult to control and made it contribute to the endemicity (Levine et. al 1978). False-positive widal test results have been reported for patients with non-enteric fever salmonellae infections, malaria, typhus, C. neoformans meningitis, immunological disorders and chronic liver disease (Chitnis et. al 2006 and Senewiratne 1977). In the predictive value of a diagnostic test depends on the sensitivity and specificity of the test and on the prevalence of the disease in the population being tested. Also, the performance of the widal test varies according to the likelihood of typhoid in the group of patients being investigated. A negative widal test result in a patient with a clinical history compatible with typhoid does not exclude the disease (Sharma et. al 1993 and Senewiratne 1977). Although new serological tests for the diagnosis of typhoid fever are becoming available, they must be carefully validated in each region before being used widely (Bhunia et. al 2008 and Balkhy 2003). Thus, it can be concluded that, in those health centres with limited facilities, elevated levels of agglutinating O and H antibodies as measured in the Widal test can be helpful in making a presumptive diagnosis of typhoid fever if interpreted with care.

#### Conclusion-

After analysis of the present study it was concluded that although blood culture is gold standard for diagnosis of typhoid fever and rising titer of Widal test also helpful for

diagnosis but elevated levels of agglutinating O and H antibodies as measured in a single Widal test might be helpful in making a presumptive diagnosis of typhoid fever if interpreted with care. Neither should a “negative” Widal test rule out the diagnosis of typhoid fever in patients with signs and symptoms of the disease since a “negative” Widal test may be seen early in the course of illness

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