



# Diagnostic Value of Widal Test in the Diagnosis of Enteric Fever: A Systematic Review

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## Abstract

Enteric fever is the most common cause of morbidity and mortality especially in the developing countries where Widal test is routinely used as diagnostic tool to rule out the disease. Given its limited sensitivity, specificity, and positive predictive value (PPV), the Widal test's diagnostic efficacy is in doubtful.. Therefore, reviewing articles across the world regarding the diagnostic value of Widal test is necessary. Therefore, the purpose of this study is to evaluate, using the typhoid quick stool antigen test, the burden and potential risk factors associated with typhoid fever among probable patients in different countries.

**Keywords;**Enteric fever,morbidity,mortality,Diagnostic,Sensitivity,Specificity,PPV,Widal test.

## Introduction

Enteric fever is a systemic disease caused by *Salmonella typhi* and is the major cause of morbidity and mortality worldwide [1]. Reports by the World Health Organization revealed that about 21 million cases and >600,000 annual deaths from typhoid fever occur throughout the world. Because of fast population expansion, growing urbanization, and limited good water and health systems, developing countries bear the most impact [2,3]. Early detection and prompt diagnosis of Enteric fever are critical for etiological diagnosis as well as identifying potential carriers who could trigger acute outbreaks of the disease.. Furthermore, because the symptoms of Enteric fever are varied and resemble those of other febrile infections, diagnosing the illness clinically can be challenging.. Serodiagnosis of Enteric fever has been attempted since the late nineteenth century by Widal and Secard. The test lies in proving that an infected patient's serum contains agglutinins (antibodies) against the H (flagellar) and O (somatic) antigens of *Salmonella enterica* serotype typhi (*S. typhi*) [4–8].. Widal test relies on the demonstration of a rising titer of antibodies in paired samples 10 to 14 days apart. In Enteric fever, however, such a rise is not always demonstrable, even in blood culture-confirmed cases. Furthermore, interpreting the test has been such a challenge that multiple cut-offs have been recorded from various locations, complicating patient care. Furthermore, the test has a low sensitivity, specificity, and positive predictive value (PPV) [9].-12] which may create over diagnosis of Enteric fever, patient dissatisfaction, inappropriate economic loss and drug resistance in particular. .. Due to factors such as decreased typhoid prevalence, availability of safe drinking water, improved laboratory capabilities for bacterial isolation, and low sensitivity, the Widal test is no longer utilized as a diagnostic tool in developed countries.

## Methods

### Study design and data source

An extensive examination of the published observational study literature was carried out. A computerized search using the databases of Medline/PubMed, Google Scholar, and HINARI (Health Inter Network Access to Research Initiative) was used to find original studies that provided data on the diagnostic value of the Widal test. A manual search using a thorough search strategy and cross-checking of reference lists was also conducted. Diagnostic value, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and test efficiency of the Widal test were the search terms used to search the database. Beginning in September, the data abstraction was completed.

### Methodological quality assessment

Using culture method as a gold standard, sample size and use of right statistical measurement to assess the diagnostic performance of Widal test were noted as quality of indicators. All assessments were entered into standardized data extraction forms that were pre-formatted. . Studies were assessed for quality and studies fulfilling 75% of quality assessment parameters were included for analysis. High quality studies were: studies that reported outcomes on at least 50 samples, cross-sectional studies and surveillances whose response rate were greater than 80% and used culture as a gold standard.

### Data abstraction

Two of the investigators (HMM, KT) worked independently on the data abstraction. The selected papers were examined using a pretested and standardized abstraction form to extract data regarding the title, authors, year of publication, country, study design, study site, study base (population-based or hospital-based), sample size, data collection process, and response rates. When there was a disagreement in data abstraction, it was resolved through consensus among the investigators.

### Statistical analysis

Epi-info version 3.5.1 and SPSS version 24 software's were used for data entry and analysis, respectively. The mean, standard deviation, range and median sensitivity, specificity, NPV and PPV of the articles were drawn. The difference was measured using P value  $\leq$  as a significance level.

### Competing Interests

The authors state that there is no conflict of interest in the publishing of this work..

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