THE USE AND INTERPRETATION OF WIDAL TEST IN THE DIAGNOSIS OF TYPHOID FEVER (*Salmonella typhi)* BY HEALTH WORKERS IN MIGORI DISTRICT, KENYA.

Peter Olute Okoth

A thesis submitted in partial fulfillment for the degree of Master of Science in Public Health in the Jomo Kenyatta University of Agriculture and Technology

2008

ABSTRACT

Typhoid fever is a systemic illness caused by the gram-negative bacillus *Salmonella enterica* serovar Typhi (*S. typhi*). It is estimated that 3% of patients with fever reporting for treatment at hospitals in Kenya are infected with the pathogen. Serological diagnosis based on the Widal agglutination test is widely used to support clinical diagnosis of typhoid fever in many areas in Kenya because it is considered affordable and easy to use. A Widal result above 1:80 for the anti-O antibody has been recommended to support the diagnosis of typhoid fever in this country. The objectives of this cross sectional study were to establish the Widal result level at which a significant majority of clinicians diagnose typhoid fever, their level of knowledge of the limitations of the Widal test and whether laboratories correctly interpreted the Widal test results in Migori District, Kenya. 250 patients referred for Widal test, clinicians and laboratory personnel were interviewed using pre-tested questionnaires. Sera from the patients were obtained and analyzed at the reference laboratory using 2 commonly used test kits and following the manufacturer's instructions and Typhidot M®. The study established that laboratory personnel in the heath facilities do not perform the Widal test as is recommended leading to variability of results between laboratories. Cross reactivity between antibodies against malaria parasites and Widal antigens appeared to influence the outcome of results at these laboratories. This influence was eliminated when tube dilution was performed ($p<0.01$). Only 1 patient tested IgM positive using Typhidot M®. Clinicians in this area diagnosed typhoid fever in patients with

Widal results reported above 1:40 for anti-O as opposed to the recommended titre levels above 1:80 ($p<0.001$). Nurses returned the least overall mean score on knowledge of limitations of the test (50.6%) compared to the other clinicians while doctors' performance (86.1%) was significantly better than all the other cadres ($p<0.001$). The reporting of antigens against other Salmonella species in sample Widal results caused uncertainty amongst the clinicians leading to the mis-diagnosis of typhoid fever. The nurses returned the least mean score (56.8%) as regards decision to treat the correct cases for typhoid fever ($p<0.001$) The study demonstrated that the test as performed and interpreted by the health workers in this area is leads to the over reporting of typhoid fever. There is need to establish a Standard Operating Procedure as regards the interpretation of the test by laboratory personnel and clinicians (nurses, doctors and clinical officers) in Migori district. The Ministry of health should undertake a study to assess whether Typhidot M® can be adapted as a serological method in the diagnosis of typhoid fever in Kenya because of its ease of interpretation. This study did not undertake isolation of the causative organism to confirm the diagnosis of typhoid fever and also isolate oher organisms that are known to cross react with Widal antigens because of the financial and time constraints. The number of clinicians interviewed, although exhaustive, was low thereby limiting the generalizability of the results of this study.