

BRC 2002065/15405

Screening of apparently healthy individuals and people suspected to have typhoid for *Salmonella typhi* agglutinins

T. T. Adebolu^{1*} and B. A. Erinle²

¹Department of Microbiology, Federal University of Technology, Akure, Nigeria

²Microbiology Laboratory, Federal University of Technology Health Centre, Akure, Nigeria

(Received September 2, 2002).

ABSTRACT: A total of two hundred and fifty blood samples were obtained from both apparently healthy individuals and people who came to Federal University of Technology, Akure, health Centre with the complaints of fever, headache, fatigue, abdominal discomfort. One hundred samples were from the healthy individuals while 150 were from those who came to the Health Centre for treatment. These samples were screened for the presence of antibodies to *Salmonella typhi* using commercially available Widal Reagent kit (Chromatest), of the 100 apparently healthy individuals screened, 10 (10%) had a reciprocal antibody titre of 40, 49 (49%) had 20, while 41 (41%) had no antibodies to *Salmonella typhi*. Of the 150 individuals with typhoid like symptoms that were screened, 30 (20%) had a reciprocal antibody titre of 80 and 3 (2%) had 160. The titres of those who came for treatment fall within the range of antibody titres diagnostic for typhoid fever which are titers $\geq 1:80$ while the titers of the apparently healthy individuals fall within the range not diagnosis for the disease. The rate of occurrence of this infection according to this investigation is 33%.

Key Words: Typhoid fever; Enteric fever; *Salmonella typhi*; Serum agglutinins.

Introduction

Typhoid fever, also known as Enteric fever is a clinical syndrome. It is a speticemic disease caused by members of *Salmonella typhi*, serotypes, paratyphi A, paratyphi B and paratyphi C. It is a common disease in developing countries (1) where it is an important cause of mortality and morbidity.

The estimated annual global incidence of this infection in such countries is approximately 21 million cases and more than 700,000 deaths (2). Although there is much information on the statistics of occurrence globally, more is still desired especially on local statistics. This work therefore is geared at investigating the rate of occurrence of this disease in Akure, Ondo State, Nigeria and the immune status of apparently healthy individuals within the same locality.

*Author to whom correspondence should be addressed.

Materials and Methods

The blood samples used were collected through venepuncture from two groups of people. The first group was the ones that came to the University Health Centre with the complaints of fever, headache, fatigue and abdominal discomfort and were sent by the doctor to the Health centre's Microbiology Laboratory for Widal test for the diagnosis of typhoid fever. The second group was the apparently healthy individuals within Akure Township. The blood samples collected were allowed to clot so that serum can be separated from the clotted red blood cells. It was the serum that was used for the investigation. For the assay, the purified serum was first diluted in twenty fold (1:20) before being diluted in two folds in microtiter plates using normal saline solution as diluent. To 0.1ml of the diluted serum in each well 0.1ml of the reagent (Widal antigen) was added and the plate was incubated at 37°C for 2hr after which agglutination was looked for. The highest dilution that has agglutinated cells was taken as the titre of the serum. Different plates were used for different blood samples and proper controls were also set up.

Results

The result of the blood screened is shown in Table 1. Out of the 250 blood samples screened comprising 100 apparently healthy individuals and 150 suspected to have typhoid, 92 people had *S. typhi* agglutinins. Of the 100 apparently healthy individuals, 59% had antibodies *S. typhi* agglutinins. The breakdown of the result is as shown in Table 2. Forty-nine of the apparently healthy individuals that are positive has reciprocal titre of 20 while 10 had reciprocal titre of 40. Out of the 33 that were positive for those that were suspected to have typhoid, 30 had reciprocal titre of 80 and 3 had reciprocal titre of 160. The profile of the antibody titres in relation to sex and age can be seen in Tables 3 and 4 respectively. From Table 3, agglutinins to *S. typhi* were seen in more males than females. However based on age groups, agglutinin titres to *S. typhi* were recorded more in age groups (11 – 30) years.

Table 1: Rate of occurrence of *Salmonella typhi* agglutinins in the blood of apparently health individuals and those suspected to have typhoid.

Blood samples from	No. Examined	No. Positive	Percentage %
Apparently healthy individuals	100	59	59
Those suspected to have typhoid	150	33	22
Total	250	92	36.5

Table 2: Distribution pattern of *S. typhi* agglutinins titres in positive individuals.

Blood samples from	Number of people that are positive for the different antibody titres.				
	1:20	1:40	1:80	1:160	Total
Apparently healthy individual	49	10	0	0	59
Those suspected to have typhoid	0	0	30	3	33
Total	49	10	30	3	92

Table 3: Profile of antibody titres to *Salmonella typhi* in relation to sex in apparently healthy individuals and people suspected to have typhoid.

Sex	Apparently Healthy		Suspected individuals	
	Titre 1:20	Titre 1:40	Titre 1:80	Titre 1:160
Male	32 (65.3%)	7 (70%)	16 (53.3%)	2 (66.7%)
Female	17 (34.7%)	3 (30%)	14 (46.7%)	1 (33.3%)
Total	49	10	30	3

Table 4: Profile of antibody titres to *Salmonella typhi* in relation to age group in apparently healthy individuals and people suspected to have typhoid.

Age group (years)	Apparently Healthy		People suspected to be infected	
	Titre 1:20	Titre 1:40	Titre 1:80	Titre 1:160
0 – 10	9 (18.4%)	1 (10%)	2 (6.7%)	0 (0%)
11 – 20	13 (26.5%)	3 (30%)	8 (26.7%)	2 (66.7%)
21 – 30	19 (38.8%)	4 (40%)	13 (43.3%)	1 (33.3%)
31 – 40	3 (10.2%)	2 (20%)	8 (20.0%)	0 (0%)
41 – 80	3 (6.1%)	0 (0%)	1 (3.3%)	0 (0%)
Total	49	10	30	3

Discussion

In many developing countries, typhoid fever caused by *S. typhi* remains an important public health problem (Pang et al., 1995). In this study, the incidence rate of this infection in Akure, Ondo State is 33% while 59% of the apparently healthy individuals sampled had appreciable titres ranging from 1:20 to 1:40 although these titres are not diagnostic for typhoid fever according to the test kit. However, the high percentage of the apparently healthy individuals having *S. typhi* agglutinins agrees with the findings of Pang and Puthurcheary (4) that majority of healthy population possess the antibodies. The significance is that this category of people is likely to mount a good humoral response to the infection when exposed to the aetiologic agent. Another interesting aspect of the study was the higher susceptibility of male to *S. typhi* infection 18 (54.6%) than female 15 (45.4%) of the positive cases. Although one may not be able to ascribe any explanation for this observation, one is inclined to agree with the suggestion of Portilo et al., (5) that genetic factor may play a role by endowing female with immunoregulatory potentials to cope better with some disease states.

In conclusion, this study has been able to give us information on the rate of occurrence of typhoid in the studied locality.

References

1. Hermans, P.W.M. and Saha, S.K. (1996). Molecular typing of *Salmonella typhi* strains from Dhaka (Bangladesh) and development of DNA probes identifying plasmid encoded multi dru resistant isolates. *Journal of Clinical Microbiology* 34: 1373 – 1379.
2. Thong, K.L. and Puthuchear, S. (1995). Analysis of *Salmonella typhi* isolates from South East Asia by pulse field gel electrophoresis. *Journal of Clinical Microbiology* 33: 171.
3. Pang, T.; Bhutta, Z.A.; Finlay, B. Band Altwegg M. (1995). Typhoid fever and other salmonellosis: a continuing challenge. *Trends in Microbiology* 3: 253 – 255.
4. Pang, T. and Puthurcheary, S.D. (1983). Significance and value of widal test in the diagnosis of typhoid fever in an endemic area. *Journal of Clinical Pathology* 36: 471 – 475.
5. Portilo, D.T. and Sullivan, J.L. (1979). Immunological basis for superior survival of females. *American Journal of Disabled Child* 133: 1251 – 1253.