

PREVALENCE OF WIDAL ANTIBODIES IN APPARENTLY HEALTHY HUMAN POPULATION

Pages with reference to book, From 269 To 271

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Abstract

Five hundred and ten serum samples of apparently healthy individuals were tested for Widal agglutinins. On screening with slide agglutination method, 113(22.16%) out of 510 sera showed positive Widal reaction. The test was positive in relatively greater number of males than females. The highest percentage (30.52) was seen in younger age group (1-20 years). Socio-economic status also had an effect on the Widal agglutinins, the highest percentage being in lower socioeconomic group. On comparing the source of water supply, it was seen that people using Municipality water exhibited higher percentage of positive Widal reaction than other sources like hand pumps and local reservoirs. Furthermore, all the 113 positive sera were titrated by tube agglutination method. The mean agglutinating titre of "O", H and Vi being $1:16.96 \pm 1.46$, $1:35.43 \pm 3.26$ and $1:12 \pm 0.54$ respectively. The present study revealed that the carrier state was greater than vaccination state (JPMA 30:269, 1980).

Introduction

Persons once infected with *Salmonella typhosa* remain carriers and play an important role in its transmission to healthy individuals. Typhoid fever may be confirmed by specific agglutination of *Salmonella typhosa* antigens (O, H and Vi) against patient's serum known as Widal test (Smith and Conant, 1962).

Although the Widal test is used to diagnose diseased cases but some apparently healthy individuals may carry typhoid agglutinins due to carrier and vaccination state or as a result of past infection. The present study is planned:

1. To assess the typhoid agglutinins (O, H and Vi) among apparently healthy human population.
2. To assess carrier and vaccination state.
3. To find association of antibodies in different socio-economic and age groups.
4. To determine the minimum normal levels of typhoid agglutinins for better interpretation of Widal test.

Material and Methods

Five hundred and ten blood samples were collected from apparently healthy individuals of both the sexes and different age and socio-economic-groups with the history of sources of water, previous attack of typhoid fever and vaccination against typhoid fever.

1. Sources of Samples:

All the samples were collected from different schools, colleges, University and Civil Hospital. Serum was separated by centrifugation and stored at 20°C until examined.-

2. Widal Test:

Antigens O H and Vi (prepared by biomeriex products and laboratory reagents/Marcy-1, Btoile 69260 charbonnieresles Bains, France)" were used. Initially the screening test was done by slide agglutination method recommended by Cruickshank et al (1975).

The samples which showed positive screening test were titrated by tube agglutination method (Kit

method). The titre of each serum was read as the highest serum dilution giving visible agglutination.

Results

The study included 510 apparently healthy individuals from Faisalabad. Of the 510 cases, 311 were males and 199 female cases. There were 54 cases in age group 1-20 years and 267 in 21-40 years, while 89 in group 41-70 years. An effort was made to include samples from various socio-economic groups. These cases recorded under 3 different groups, i.e. lower, middle and upper class.

Widal test was performed on the sera obtained from these cases. Initially only screening test was done on undiluted serum and it was observed that 113(22.16%) samples exhibited antibodies to Widal antigens. Widal test was positive in relatively greater number of males than females.

Out of 113 positive cases as the maximum number, 55(48.67%) showed Vi agglutinins whereas O and H agglutinins were seen in 23(20.35%) and 35(30.97%), cases respectively. Thus showing that carrier state was commoner than the vaccination state amongst Widal positive cases.

On comparing the Widal agglutinins according to socio-economic status, it was observed that low income group showed maximum percentage (25.49) of positive cases and minimum percentage (14.7) was seen in high income group (Table II).

Table I: Screening Test of Widal Antigens on Normal Healthy Population in Relation to Age

	<i>A</i> (1-20 years)	<i>B</i> (21-40 years)	<i>C</i> (41-70 years)
Positive	47 (30.52%)	52 (19.48%)	14 (15.73%)
Negative	107	215	75
Total:	154	267	89

$X^2 = 9.49$, d.f. = 2 ($P < 0.05$) significant.

Table II: Screening Test on Widal Antigen in Relation to Socio-economic Groups

	<i>Lower Class</i> Rs. upto 999	<i>Middle Class</i> Rs. 1000-1999	<i>Upper Class</i> Rs. 2000 and above
Positive	65 (25.49%)	38 (20.3%)	10 (14.7%)
Negative	190	149	58
Total:	255	187	68

It was further noted that there was a significant ($P < 0.05$) association between age and typhoid agglutinins (Table I). The highest percentage of positive cases are recorded in group A (1-20) and the lowest in group C (41-70 years).

A significant association ($P < 0.05$) between sources of water and Widal agglutinins was noted. Highest percentage 55(27.91%) of positive cases was recorded in individuals using municipality water (Table III).

Table III: Association Between Sources of Water and Presence of Widal Agglutinins

	<i>Hand Pumps</i>	<i>Municipality Supplies</i>	<i>Local Reservoirs</i>
Positive	50 (18.86%)	55 (27.91%)	8 (16.68%)
Negative	215	142	40
Total:	265	197	48

$\chi^2 = 6.295$, d.f. = 2 ($P < 0.05$) significant.

The significant association ($P < 0.05$) between eating habits of individuals who lived in the hostels showed the maximum percentage (31.74) of positive Widal tests and minimum percentage was shown by those who had their meals at home (Table IV).

Table IV: Association Between Eating Habits and Presence of Widal Agglutinins

	<i>Home</i>	<i>Hostel</i>	<i>Community Mess</i>
Positive	60 (18.69%)	40 (31.74%)	13 (20.63%)
Negative	261	86	50
Total:	321	126	63

$X^2 = 8.537$, d.f. = 2 (P < 0.05) significant.

The sera showing positive Widal test on screening, were subjected to quantitative assessment of Widal agglutinins. The mean titres of O, H, and Vi agglutinins were recorded as 1:16.96±1.46, 1:35.43±3.26 and 1:12±0.54, respectively (Table V).

Table V: Titre of Widal Agglutinins

<i>Agglutinins</i>	1:10	1:20	1:40	1:80	<i>Means ± S.E.</i>
O	9	13	1	—	1:16.96 ± 1.46
H	2	13	16	4	1:35.43 ± 3.26
Vi	44	11	—	—	1:12 ± 0.54

Discussion

The study was conducted on 510 apparently healthy individuals of Faisalabad selected from various walks of life in different age groups, professions and from both the sexes.

On screening test with slide agglutination technique the Widal test was positive in 113 (22.16%). The results under report are in agreement with the findings of Towne (1934) who reported a higher incidence of Widal agglutinins in South Dakota as 21 per cent of normal population.

The percentage of O agglutinins (20.35) noted in the present study is slightly lower than those (25.35) reported by Mackenzie and Taylor (1948). The percentage of H agglutinins (30.97) noted in present study is much lower than those (40%) reported by Mackenzie and Taylor (1945). Percentage of Vi agglutinins noted as 48.67 was again similar to that (39%) reported by Costa and Almeida (1950). In present study, the carrier state recorded as 11 per cent is in agreement with that of 11.4 percent

reported by Dean (1931). The vaccination state noted as 7 per cent is much lower than (40-50%) reported by Echer and O'Neal (1932). This difference reflects the poor vaccination programme of our country.

Widal test was positive in relatively greater number in males (24.76%) as compared to females (18.09%) this finding is in agreement with that reported by O'Conner (1958). Higher frequency in males might be due to difference in the eating habits. It was further demonstrated in the present study that age has significant association with Widal agglutinins as group A (1-20 years) showed highest percentage (30.52). These findings are similar to earlier reports by Levine et al (1978). As regards socio-economic status it was seen that lower class showed maximum number (25.49%) of Widal positive cases. This may be due to poor hygienic conditions in lower class as compared to middle and higher classes.

In the present study the significant association of sources of water and eating habits to Widal agglutinins were recorded which is partially in agreement with findings of Nerlich (1934).

The levels of O agglutinins noted in the present study $1:16.96 \pm 1.46$ are similar to those reported earlier as $<1:32$ and $<1:40$ (Forrest et al., 1967; Levine et al., 1978). The level of mean titre for H agglutinins was found as $1:35.43 \pm 3.26$ and is in agreement with those (1:40) reported by Forrest et al (1967).

The mean titre of- Vi agglutinins noted as $1:12 \pm 0.54$ is also similar to those (1:8) reported by Gaidamaka et al (1955).

Thus the present study showing the incidence and level of O, H and Vi agglutinins in normal healthy population reflects our carrier and vaccination state. It will also help in better interpretation of the Widal test. However, a larger series is recommended in different parts of the country to know the real picture.

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