

Incidence of Typhoid Fever in Islamabad, Pakistan

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Abstract: Enteric fever like typhoid showed the highest morbidity in Asia with approximately 93 % of global episodes has been contributed by this region. Poor hygiene, poor sanitation and sewerage system, over population are the key contributing factors. The exact typhoid fever epidemiological figure of Islamabad is not present, so keeping in view this reason this study was designed. Fifteen hundred clinical isolates regardless of age and gender were collected from typhoid fever suspects visited Capital Development Authority (CDA) hospital during January 2014 to December 2014. Immunochromatographic tests (ICT) were performed to detect acute (IgG) and chronic (IgG) stage antibodies in suspected patient's serum. Test revealed that 348 (23 %) patients were positive for IgM antibodies, 74 (5 %) for IgM plus IgG both and interestingly not a single sample was positive for IgG. Gender wise seropositivity for IgM was 129 (37 %) males and 219 (63 %) females. In case of IgG/IgM both positive antibodies 31(42 %) were males and 43 (48 %) were females. This high prevalence of typhoid fever among fibril patients visiting hospital indicates that typhoid fever is a major public health concern among febrile illnesses in Islamabad. Preventive strategies such as immunization programs, improvements sanitary standards, clean water supply and proper sewerage system should be the focus of typhoid control in urban city like Islamabad.

Key words: Typhoid Fever • *Salmonella* • IgG • IgM Islamabad • Pakistan

INTRODUCTION

The incidence of typhoid fever has a long history which can be traced back to classic study by Austin Flint in 1843 [1]. This clinical syndrome caused by *Salmonella* infection in humans is broadly divided into two groups. Typhoid fever transmitted by contaminated water or food is mainly caused by *Salmonella enterica* serovar Typhi (typhoid fever) or *Salmonella enterica* serovar Paratyphi A, B or C (paratyphoid fever) [2]. *Salmonella* is a gram negative bacilli, facultative anaerobe, common characterized by milder symptoms like fever, headache, constipation, malaise, anorexia, relative bradycardia, constipation or diarrhea but severe symptoms like gut perforations, encephalitis and in severe condition deaths have frequently been reported [1, 3].

World Health Organization in 2014 reported about 21 million typhoid cases and 0.2 million typhoid-related deaths around the world [4]. About 2.16 million episodes of typhoid fever with 0.2 million deaths took place in 2000 worldwide out of which 93 % of were contributed by Asian countries. Worldwide high incidence of typhoid is present in developing countries and significantly high in Asia [5].

In 2008, it was reported that among Asian countries India and Pakistan had high incidence rate of enteric fever, than Indonesia, China and Vietnam [6,7]. A study conducted in Bangladesh during 2001 showed that among fibril illness typhoid fever was the prevent one and was about 72.7% [8]. Another study 2010 reported 88 % typhoid fever among children of semi urban areas of Bangladesh [9] and Iran was endemic 54 % in 2010 [10].

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A study conducted in 2003 which reported that water borne infections claim 250,000 deaths each year in Pakistan among which typhoid fever is the leading cause [11]. According to study in 2013 in pediatric patients in Quetta reported 18.6% patients were positive serologically for typhoid and a study conducted in Karachi in 2006 exposed that serological based typhoid incidence rate was 710/100,000 while in blood culture it was 170/100,000 [2].

Islamabad is the capital of Pakistan, having the highest literacy rate in Pakistan at 88% and more develop among the others cities in Pakistan. This study is important in context of Islamabad because there is no past study available to show exact figures of prevalence of typhoid fever in Islamabad.

MATERIALS AND METHODS

This study was designed in Department of Medical Lab Technology in University of Haripur and conducted in Capital Hospital Islamabad (CDA) from January 2014 to December 2014. Patients inclusion criteria was febrile ill patients with history of fever of 2-3 days, headache, constipation/diarrhea, malaise, anorexia and nonproductive cough were taken under consideration. A proper consent was taken from each patient and in case of child from his/her guardian at the time of specimen collection. Specimens were collected from both indoor and outdoor patients with typhoid illness. About 3 mL of whole blood collected aseptically by venepuncture technique from patients in sterile gel tubes and after proper clotting, serum was separated by centrifugation at 3000 rpm for 5 minutes.

Typhidot® test kit was used for detection of IgG and IgM antibodies against immunogenic 50kDa outer-membrane protein antigen (OMP) specific for *Salmonella enterica* serovar Typhi (S. typhi) immobilized on nitro-cellulose membrane (Reszon Diagnostics, Selangor, Malaysia). About 50 µL test serum was applied on the sample pad and waited for 10 minutes. Patient sample positive for IgM showed colour band against IgM area or IgG against IgG in case of mixed antibodies both IgM/IgG test band will positive result along with control band. All the data collected from the above mentioned assays were analyzed and represented graphically and in tabular form using Microsoft Excel different tools.

RESULTS

In this study 1500 typhoid suspected patients were enrolled not considering age and gender. The age of subjects ranged from three years to 66 years, with a median of 34.5 years. Suspected patient's serums were tested for the detection of typhoid fever IgM and IgG antibodies. Test revealed that 348 (23 %) patients were positive for IgM antibodies, 74 (5 %) for IgM plus IgG both and interestingly not a single sample was positive for IgG. Gender wise seropositivity for IgM was 129 (37 %) males and 219 (63 %) females. In case of IgG/IgM both positive antibodies 31(42 %) were males and 43 (48 %) were females. About 1078 suspected individual were declared as typhoid negative, results are depicted in tabular and graphical form (Table No.1 and Figure No.10).

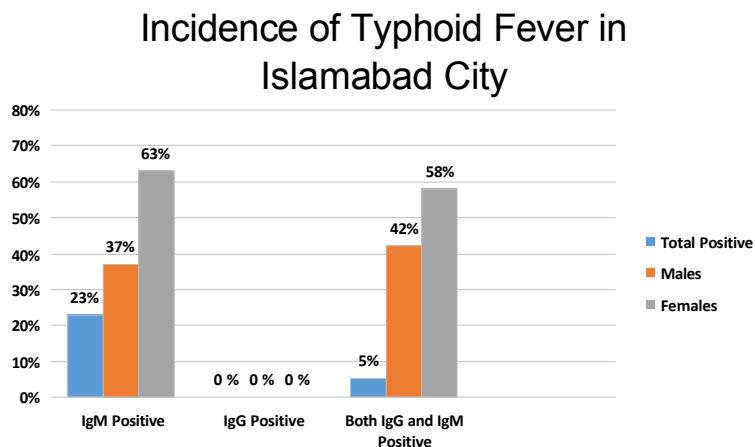


Fig. 1: Incidence of Typhoid fever in Islamabad during 2014 (n=1500).

Table 1: Results of Typhoid fever Incidence in Islamabad City (n=1500)

	IgM Positive	IgG Positive	Both IgG and IgM Positive
Male	129 (37 %)	0 (0 %)	31 (42 %)
Female	219 (63 %)	0 (0 %)	43 (48 %)
Total	348 (23 %)	0 (0 %)	74 (5 %)

DISCUSSION

Typhoid fever is one of the most important infectious diseases of South East Asian countries like Pakistan as it has been responsible for causing high rate of morbidity and mortality in this country. Many sporadic or epidemic cases have been reported throughout the whole year across the country. Typhoid fever is still prevalent in rural areas are attributable to lack of safe drinking water supply, poor hygiene and contaminated food. Like other Asian countries; typhoid fever can be an important indicator of socio-economic condition of population [13]. Sulaiman and Sarwari (2007) reported that worldwide the most notorious hotspots for typhoid fever are Pakistan, India, Egypt, Mexico, Indonesia, Peru and Nepal [14].

In this study clinical isolates from suspected patients were collected for complete one year to check the epidemiological status of typhoid fever in Islamabad. To diagnose the acute and chronic stage of typhoid fever, Typhidot® rapid serology test has been used. Typhidot® test is cheap, single-use, disposable, easy to perform/interpretation, requires no special equipment/training and is complementary test to blood culture and Widal typhoid fever diagnosis [15].

There was no prior study exist which shows typhoid fever incidence in Islamabad city. However there are few studies conducted indifferent cities of Pakistan, a study conducted in Karachi, which showed about 43 % of serologically positive cases. Out of which approximately 21 % were IgM positive, IgG were present in 1.47 % and 19.7 % were declared positive for both IgG and IgM antibodies, our results are in line with our finding [16]. A research report revealed that about 0.25 million deaths in Pakistan are mainly contributed by water borne diseases [11].

In the Indian sub-continent and parts of sub-Saharan Africa hygienic food, water and sewerage conditions are below the satisfactory levels which are the key factors in the spread of this deadly disease. Typhoid fever is still one of the most widespread infectious diseases [1,12,17,18]. This problem is still on rise in developing countries and is relatively lower in developed countries [19]. A study conducted in Asia describe that the typhoid accounts for more than 13 million cases each year with

more than 0.6 million deaths per year [5]. According to study, worldwide rate of deaths due to typhoid are about 0.2 million [18].

In present study we found females are more affected than males, similar finding have been reported in a study done in Khyber Pakhtunkhwa [20] and contrary to finds of research report done in Iran [10]. One of the possible reasons why females are more affected than males is that as children are more susceptible to typhoid infection and so child caring responsibilities of females make them more susceptible for infection [21].

In our study Typhidot® positive patients were IgM positive, as IgM is the first immunoglobulin class produced against foreign antigens, followed by IgG which is increased in chronic infections. Not a single patient was observed positive for IgG antibodies, it might be because of inclusion criteria of this study in which only febrile patients were enrolled. Secondly the presence of IgG is the indication of recovery of patients from the infection. A study conducted on sensitivity of Typhidot® exposed that this test relies a lot on IgM results as it appear earlier than IgG in the course of the illness [22].

Keeping in view the results of this study it can be concluded that proper supplied of clean drinking water, better sewerage system and vaccination, along with strict planning and proper targeting of the vulnerable age groups, is considered to be an effective tool in controlling this disease in Islamabad. But this is not enough we need better planning and eradication programs to overcome this disease not only in capital city but throughout the Pakistan.

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