**Prevalence of Typhoid in District Mansehra, Pakistan**

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**Abstract**

Enteric fever is one of the most perilous issues in Pakistan and it’s how maximum incidence in the Middle East with roughly 93% of overall scenes. It is a methodical disease that is spread with the aid of the consumption of infected food and water with *Salmonella* typhi and Paratyphi. The exact typhoid fever outbreaks discern of district Mansehra is absent, so the motivation behind this examination was to investigate the incidence of typhoid fever. An absolute 1175 sufferers get signs of typhoid fever such as poor appetite, headache, high fever, stomach pain, constipation, and vomiting had been covered in this investigation. Out of 1175 typhoid presumes 200 are typhoid clear in addition to allover of 200 clear samples, the male group is usually 120 (15.8%) over females 80 (6.9%). Therefore typhoid was progressively predominant in Mansehra 17.02%.

**Keywords:** Typhoid fever, prevalence, Mansehra, Pakistan

**Introduction**

*Salmonella* enterica serotype Typhi (*S*. Typhi) caused typhoid fever which is a systemic infection. This illness continues to be a serious issue across the world. In 2000, the global outbreak of typhoid was approximated at over 2.16 million episodes, resulting in a total of 216 000 deaths and over 90% deaths and illness in Asia (Crump *et al*., 2004). A 2003 study reported that in Pakistan 250,000 deaths per year are claimed by waterborne infections, which include typhoid Fever (Siddiqui *et al*., 2006). Recent reports indicate that typhoid fever, along with an estimated 120 million infections and 700,000 annual mortalities, is very common in developing countries (Rahman *et al*., 2014). Studies in epidemiology have shown that in South-East and Central Asian regions 100/1000,000 people have the highest endemic rates per year (Yung *et al*., 2004). In Pakistan, typhoid fever is present in 412 cases per 100,000 population (WHO, 2008). Due to the low standards of drinking water sources, hygiene and sanitation environment, it continues to suffer the burden of infectious diseases (Sinha *et al*., 1999 & Brooks *et al*.,2005). The illness is usually predominant in poorly developed and growing countries in which food hygiene is bad, specifically in components of south Asia (Crump, *et al*., 2004). *Salmonella* Typhi is carried through the fecal-oral route, either from individual to individual or with the aid of consumption of infected food or water (Department of Health, 2008). The incubation Duration of *S*. Typhi can range within two weeks. Over the incubation duration of the *S*. Typhi goes into the small digestive tract, connects self to the epithelium and that enters in submucosa at that place they are inundated through the monocytes. *S.* Typhi opposes intracellular executing and duplicates in the monocytes. They move to the mesenteric lymph nodes, increase their number there and get in touch with circulatory fluid ensuring in predominant bacteremia, seeded within the liver, gallbladder, spleen, lymph node, bone marrow, the place they keep on increasing. Over predominant bacteremia, microbes acquired get entry to the circulatory system as a result of secondary bacteremia. When microbes are shed through the gall bladder alongside with the bile juice, they come again in the small intestine, promoting to inflammation (Rao, S. S. 2009). The primary sign is the fever typically the temperature increase and may influence an abnormal state of 39°C to 40°C these few days. The particular rash now does not affect each person, comprises of rose-hued spots, especially on the abdomen and neck (Raffatellu *et al*., 2008). Some differences can involve malaise, headache stomach pain, abdominal distension as well as other constitutional sign. A major complication comprises meningitis osteomyelitis, myocarditis, nephritis, cholecystitis, thrombophlebitis, pneumonia, urinary retention, intestinal hemorrhage, and intestinal perforation (Raffatellu *et al*., 2008 & Sultana *et al*., 2016). Typhoid fever still can be treated with suitable antimicrobial therapies 3–5 percent of patients are the lifetime carrier. (Brooks *et al*., 2004). Fluoroquinolones are the medicine of choice for the treatment of typhoid, yet with antimicrobial resistance raising its head, there are several reports of therapeutic failure with fluoroquinolones (Medalla *et al*., 1999). Three first-line groups of antimicrobial agents are well-defined as Multidrug resistance (MDR), (i.e. chloramphenicol, ampicillin, and trimethoprim/sulfamethoxazole) this has been common almost everywhere in South Asia, with estimates in India at 13 percent and Pakistan at 44 percent (Qamar *et al*., 2014). Previous research in Pakistan has shown an increase in resistance to ciprofloxacin. Antibiotic resistance trends are on the rise with novel MDR strains of salmonella (Khan *et al*., 2012). While a better quality of water and hygiene are the primary approaches to this issue, vaccinations in hazard zones are a possible way of preventing approved by the WHO for the short term at least (WHO 2003). Two safe and successful typhoid vaccines, intravenous Vi polysaccharide and oral Ty21a were certified; and modern, enhanced model immunizations are undergoing testing (Acharya *et al*., 1987 & Simanjuntak *et al*., 1991). Moreover, typhoid vaccines are still not introduced as a standard measure of public safety in several endemic typhoid populations despite the low price of the vaccine (Vi polysaccharide costs approximately US$ 0.50 per dose) and the heavy price of managing the disease (Bahl *et al*., 2004). Decision-makers in many developed nations have suggested that up-to-date data on the occurrence of typhoid in certain states are necessary prior to the implementation of vaccination into programs (DeRoeck *et al*., 2005).

**Materials & Methods**

**Rapid diagnostic method:**

All cases diagnosed mainly as typhoid fever in DHQ are used to evaluate the frequency of typhoid fever and other private hospitals of Mansehra, from Oct 2018 to March 2019 estimated timing is six months. We collected blood samples from 1175 patients in association with gender and age groups are included. From each, a proper and appropriate approval was obtained throughout the case of children from his / her parent also at the moment of sample collection. Around 3cc of blood obtained by a patient's venipuncture syringe & after appropriate clot formation, the serum was isolated by a centrifuge at 3000 rpm for 5 minutes just after the Typhi dot test kit had been used to identify IgG & IgM. Take the test pattern out of the foil bag and put it horizontally, (10 μl) apply the whole blood/serum to it, and after that, the specimen is fully absorbed then, smear two droplets of dilute to the specimen hole assay. The interval of 15 minutes and the interpretation of data, for which monitor band doesn't appear, is called an incorrect outcome.

**RESULTS**

In October, March, and February the high rate of prevalence was observed. While January and November showed the least infection rate.

**Graph No 1:** shows Prevalence of typhoid fever, according to months

# Graph No 2: indicates the frequency of enteric fever within the age demographic.

The average 21% considerably higher prevalence of enteric fever was determined in 11–20 years age group amongst 210 suspected patients, followed by 31–40 elderly and 41–50 (20.5% and 18.46%) correspondingly (Graph no: 2).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Serial No.** | **Gender** | **Suspected subjects** | **Positive** | **Percent positively** |
| 1 | Male | 756 | 120 | 15.87% |
| 2 | Female | 419 | 80 | 6.91% |
| **Total** | | 1175 | 200 | 17.02% |

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# Table No 3: Prevalence of typhoid fever according to gender

The recurrence of typhoid is noted for being relatively higher (15.87 percent, n=120) in male out of 756 presumed male patients comparative with females.

**DISCUSSION**

Typhoid fever is a virulent infection of Asian south-east states Pakistan while it became accountable as resulting rapidly in incidence and death. Numerous plague instances were being recorded during the state's whole year. Typhoid fever is never the less frequent in rustic sites are as a consequence of the absence of infected water, unhygienic as well as infected food. Enteric fever may be an essential index of the financial state of the community (DeRoeck *et al*., 2005 & Bajracharya et al., 2014). Stated that around the world the best contemptible critical points for enteric fever are Nepal, Pakistan, Mexico, Egypt, India, Indonesia as well as Peru (Bajracharya *et al*., 2014)

To identify the intense and persistent phase of *Salmonella* typhi infection typhoid kit test. Typhoid kits test is basic, one-time, discard able, and convenient to operate, and need no distinct materials. *Salmonella* typhi infection never the less remains a predominant native general health issue in Pakistan mainly in regions whither has health center being constrained as well as people’s are uneducated, residing in an unclean environment, drinking contaminated water by using well as well as not regular of handwashing from latrine with the aid of soup.

Even so, there is some research carried out in various urban areas of Pakistan, an examination performed in Karachi, which usually confirmed around 43 % of the serologically effective instance. All of that around 21 % had been IgM effective, IgG has been found in 1.47 % as well as 19.7% had been reported effective for each IgM along with IgM immune globulin. (Moorhead *et al*., 2002). A study record uncovered that approximately 250,000 are dying within Pakistan are mostly assisted through water-borne infections (Suleiman, *et al*., 2007). Overall prevalence typhoid fever was found (17.2%) in Mansehra five months from October to March 2019. In any case, it is likewise researched on the bases of age and sexual orientation. The ongoing research indicates that the occurrence rate of enteric fever has been considerably less in the female subject (6.91%)as compared to themale subject (15.87%). The incidence of enteric fever has been observed high within the rustic region as a contrast with cities. The primary variables, adding to the excessive incidence of enteric fever within the rustic region that consists of less residing requirement, bad or even lack of cleanliness, with a large population, absence of availability to pure drinking water, eating of contaminated food along with the absence of clinical services for appropriate diagnosis along with a remedy. The current investigation encouraged that the state has to supply healthful food along with water, health maintenance services to the general population residing within unhygienic regions (Saha *et al*., 2003).

**5. Conclusion**

Typhoid fever is more prevalent in Mansehra, Pakistan. Most of the cases are seen in the male population. These findings support the decision to vaccination against typhoid fever. Outbreaks of typhoid fever are not only related to climate changes but involve hygiene as well. While progress in sewage disposal seems to be the ideal solution for infection control. We need to create awareness about typhoid among the general community.

**REFERENCE**

1. Crump, J. A., Luby, S. P., & Mintz, E. D. 2004. The global burden of typhoid fever Bulletin of the World Health Organization 82:346-353.
2. Siddiqui, F.J., F. Rabbani, R. Hasan, S.Q. Nizami and Z.A. Bhutta, 2006. Typhoid fever in children: some epidemiological considerations from Karachi, Pakistan, Int. J. Infect. Dis. 10(3): 215-222.
3. Rahman BA, Wasfy MO, Maksoud MA, Hanna N, Dueger E, House B. 2014. Multi-drug resistance and reduced susceptibility to ciprofloxacin among Salmonella enterica serovar Typhi isolates from the Middle East and Central Asia. New Microbes New Infect. 2: 88-92.
4. Yung A, Ruff T, Torres J. 2004. Manual of travel medicine: a pre-travel guide for health care practitioners. 2nd edd. Melbourne: IP Communications.
5. Sinha A, Sazawal S, Kumar R et al. 1999. Typhoid fever in children aged less than 5 years. Lancet. 354:734−737.
6. Brooks WA, Hossain A, Goswami D. 2005. Bacteremic typhoid fever in an urban slum, Bangladesh. Emerg. Infect. Dis. 11:326–329.
8. Department of Health, 2008
9. Rao, S. S. 2009. Engineering optimization: theory and practice. JohnWiley & Sons.
10. Raffatellu, M., Wilson, R. P., Winter, S. E., & Baumler, A. J. 2008. Clinical pathogenesis of typhoid fever. The Journal of Infection in Developing Countries*,* 2(04): 260-266.
11. Sultana, S., Al Maruf, M. A., Sultana, R., & Jahan, S. 2016. Laboratory Diagnosis of enteric Fever: A Review Update. Bangladesh Journal of Infectious Diseases. 3(2): 43-51.
12. Brooks, G., Butel, J. S., Ornston, L. N., Jawetz, E., Melnick, J. L., & Adelberg, E.A. 2004. Enteric gram-negative rods (Entero bacteriaceae) Jawetz, Melnick, & Adel bergs Medical Microbiology. 23rded. USA: McGraw- Hill, 248-61.
13. Medalla F, Sjolund-Karlsson M, Shin S, Harvey E, Joyce K, Theobald L. 2011. Ciprofloxacin-resistant Salmonella enterica Serotype Typhi, United States. Emerg Infect Dis. 17:1095-8.
14. Qamar FN, Azmatullah A, Kazi AM, Khan E, Zaidi AK. 2014. A three-year review of antimicrobial resistance of Salmonella enterica serovars Typhi and Paratyphi. A in Pakistan. J Infect Dev Ctries. 8: 981-6.
15. Khan MI, Soofi SB, Ochiai RL, Khan MJ, Sahito SM, Habib MA, et al. Epidemiology, clinical presentation, and patterns of drug resistance of Salmonella Typhi in Karachi, Pakistan. J Infect Dev Ctries. 2012; 6:704-14.
16. Background document: The diagnosis, treatment and prevention of typhoid fever. Geneva: WHO; 2003.
17. Acharya IL, Lowe CU, Thapa R, Gurubacharva VL, Shrestra MB, Cadoz M. 1987. Prevention of typhoid fever in Nepal with the VI capsular polysaccharide of Salmonella typhi. A preliminary report. N Engl J Med. 317:1101-4.
18. Simanjuntak CH, Paleologo FP, Punjabi NH, Darmowigoto R, Soeprawoto, Totosudirjo H. 1991. Oral immunisation against typhoid fever in Indonesia with Ty21a vaccine. Lancet.338:1055-9.
19. Bahl R, Sinha A, Poulos C, Whittington D, Sazawal S, Kumar R. 2004. Costs of illness due to typhoid fever in an Indian urban slum community: implications for vaccination policy. J Health Popul Nutr. 22:304-10.
20. DeRoeck D, Clemens JD, Nyamete A, Mahoney RT. 2005. Policymakers views regarding the introduction of new-generation vaccines against typhoid fever, shigellosis and cholera in Asia. Vaccine. 23:2762-74.
21. Bajracharya, D., Khan, M. I., Pach III, A., Shrestha, P., Joshi, N., Upreti, S. R., & Ochiai, R. L. 2014. 25Y ears after VI typhoid vaccine efficacy study, typhoid affects significant number of population in Nepal. PloSone One, 9:1. 77
22. Suleiman, K., & Sarwari, A.R. 2007. Culture confirmed typhoid fever and pregnancy. International Journal of Infectious Diseases, 11:4, 337-341.
23. Saha, M.R., Dutta, P., Palit, A., Dutta, D., Bhattacharya, M.K., Mitra, U., &

Bhattacharya, S. K. 2003. A note on incidence of typhoid fever in diverse age group sin Kolkata, India. Japanese journal of infectious diseases, 56:3. 121-122.

1. Moorhead, R. 2002.William Budd and typhoid fever. Journal of the Royal society of Medicine, 95:11. 561- 564.