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ESTIMATION OF TYPHOID FEVER IN RISK ASSOCIATED WITH LACK OF ACCESS TO CLEAN WATER

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Abstract:
Introduction: *Typhoid fever is a systemic bacterial illness of public health importance. The disease is transmitted person to person due to fecal contamination of food and water.*
Objectives: *The main objective of the study is to analyse the estimation of typhoid fever in risk associated with lack of access to clean water.*
Material and methods: *This cross sectional study was conducted in Services Hospital, Lahore during March 2019 to November 2019. The data was collected for the analysis of risk of fever in association with the risk of clean water.*
Results: *The data was collected from 300 participants. Table 01 shows some resources of water in selected area of participants. Among participants who reported drinking water from a source other than their main household water source, cases were more likely to have drunk water from a surface water source than controls.*
Conclusion: *It is concluded that exposure to unimproved water or unsafe water is significantly associated with typhoid fever.*

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INTRODUCTION:

Typhoid fever is a systemic bacterial illness of public health importance. The disease is transmitted person to person due to fecal contamination of food and water. The causative agent, Salmonella enterica serovar Typhi (S. Typhi), is exclusive to humans who are the natural host and reservoirs [1]. Humans can become chronic carriers and food handling practices among carriers can result in food contamination and S. Typhi transmission. However, use of sewage contaminated water for irrigation and domestic use is considered critical in maintaining typhoid endemicity in developing countries as demonstrated in Santiago, Chile [2]. Since the major routes of transmission of typhoid fever are through drinking water or eating food contaminated with Salmonella typhi, the World Health Organization (WHO) recommends provision of safe water as one of the preventive measures for typhoid fever [3].

Typhoid fever is mainly spread by the faecal oral route; therefore transmission is high in areas where the risk of food and especially water contamination is high. Factors that influence contamination of drinking water are the non-availability of piped water, and proper drainage of sewage [4]. Individual risky behaviour such as not washing hands after defecation and before meals are another contributing factor for typhoid spread. In South East Asia, the incidence of typhoid fever in children is high in urban low socio-economic squatter settlements where population density is high and living conditions are compromised.

Defining and monitoring quality and ensuring water safety in low- and middle-income countries (LMICs) are challenging. The WHO defines microbiologically safe water based on the amount of Escherichia coli which should be 0 CFU/100 ml [5] suggesting there should not be any fecal contamination. Continuous monitoring of the microbiologically safe water requires periodic laboratory testing of water sources which is difficult in resource poor settings of LMICs. To simplify the process WHO-UNICEF Joint Monitoring Programme (JMP) has defined alternative indicators, "improved water" and "unimproved water" sources [6], which deemed to represent safe water and unsafe water, respectively.

Objectives:

The main objective of the study is to analyse the estimation of typhoid fever in risk associated with lack of access to clean water.

MATERIAL AND METHODS:

This cross sectional study was conducted in Services Hospital, Lahore during March 2019 to November 2019. The data was collected for the analysis of risk of fever in association with the risk of clean water. The data were collected prospectively using a surveillance network to capture typhoid fever cases in children aged 2–16 years. We assessed the risk factors for typhoid fever in these informal settlements. The data was collected through systematically designed questionnaire. This include all the demographic data of selected participants and questions related to lack of access to clean water.

The data was collected and analysed using SPSS version 19. All the values were expressed in mean and standard deviation.

RESULTS:

The data was collected from 300 participants. Table 01 shows some resources of water in selected area of participants. Among participants who reported drinking water from a source other than their main household water source, cases were more likely to have drunk water from a surface water source than controls.

Table 01: Water resources in selected area of Lahore

Improved drinking water source	Unimproved drinking water source
Piped water into dwelling, yard or plot	Unprotected spring
Public tap or standpipe	Unprotected dug well
Tubewell or borehole	Cart with small tank/drum
Protected dug well	Tanker-truck
Protected spring	Surface water
Rainwater collection	Bottled water from unimproved water sourc

Table 02: Drinking water resources in selected area

Risk factor/ Exposure	Number and (%) of cases		Number and (%) of controls		Conditional odds ratio	Exact 95% confidence Intervals	p-value
Water source, treatment, and drinking							
Piped treated	88	(50.3)	172	(49.3)			
Piped untreated	31	(17.7)	77	(22.1)	0.50	0.18–1.42	0.196
Rain water	4	(2.3)	5	(1.4)	1.67	0.38–7.39	0.502
Surface water	52	(29.7)	95	(27.2)	1.28	0.35–4.70	0.713
Main water source accessed from outside house	118	(67.4)	68	(19.5)	2.96	1.20–7.29	0.018
Water not always available from main source	49	(28.0)	62	(17.8)	2.40	1.39–4.12	0.002
Treated water in house	50	(28.6)	107	(30.7)	0.89	0.57–1.39	0.596
Stored water in house	139	(79.4)	269	(77.1)	1.16	0.73–1.85	0.530
Drank untreated water	76	(43.4)	126	(36.1)	1.80	1.07–3.03	0.027
Only drank water from main household water source	10	(59.4)	232	(66.5)	ref	-	
Drank water at a mass gathering	14	(8.0)	19	(5.4)	1.51	0.74–3.10	0.256
Consumed ice	69	(39.4)	131	(37.5)	1.14	0.77–1.68	0.524
Drank water/other drink from a street vendor	57	(32.6)	97	(27.8)	1.34	0.86–2.09	0.189

DISCUSSION:

Although poor water and sanitation system is not the only risk for typhoid transmission, its undisputable importance makes it a key risk factor in defining high-risk groups. Demarcating the typhoid fever risk groups is especially important in effectively targeting control measures such as vaccination programs. The WHO has recommended targeted vaccination of high-risk population with existing typhoid polysaccharide vaccine [7]. The significance of defining high-risk groups has increased with impending availability of typhoid conjugate vaccine, which may necessitate revisiting of WHO policies on vaccination strategies based on well-delineated target population. Most surveillance studies were conducted in known typhoid high-risk populations, which cannot be simply extrapolated to general population because their risk of typhoid fever is lower [8]. One of the several risk corrections that can be made in applying the typhoid fever incidence from high-risk population to general population is correct for water-related risk. However, there is no data available at global level of safe water drinking, but there is a database available on improved water and unimproved water [9]. Whereas improved water is representative of safe water and unimproved water is representative of unsafe water, the only available database can be applied at the global level for water-related correction in disease burden estimate. Computing the excess risk associated with the consumption of unsafe water or unimproved water will help in understanding the additional typhoid risk in certain populations and helps in measuring risk-differential typhoid fever incidence in different communities [6] Such characterization of disease burden that can be linked to access to improved water can help in developing risk-based vaccination strategies and forecasting vaccine demand, identifying high-risk populations within countries and targeting vaccination to specific population, estimate its impact, calculate cost-effectiveness, and compare the efficiency of targeted vaccination versus vaccination of whole population [10].

CONCLUSION:

It is concluded that exposure to unimproved water or unsafe water is significantly associated with typhoid fever. Our findings suggest that the population without access to safe water may be considered as one indicator to delineate high-risk population for typhoid related interventions.

REFERENCES:

1. Anita S. B., Amir K. M., Fadzilah K., et al. Risk factors for typhoid outbreak in Sungai Congkak recreational park, Selangor 2009. Medical Journal of Malaysia. 2012;67(1):12–16.

2. Lee J.-S., Mogasale V. V., Mogasale V., Lee K. Geographical distribution of typhoid risk factors in low and middle income countries. BMC Infectious Diseases. 2016;16(1, article no. 732)
3. Mermin J. H., Villar R., Carpenter J., et al. A massive epidemic of multidrug-resistant typhoid fever in Tajikistan associated with consumption of municipal water. The Journal of Infectious Diseases. 1999;179(6):1416–1422. doi: 10.1086/314766.
4. Karkey A., Thompson C. N., Tran Vu Thieu N., et al. Differential epidemiology of Salmonella Typhi and Paratyphi A in Kathmandu, Nepal: a matched case control investigation in a highly endemic enteric fever setting. PLOS Neglected Tropical Diseases. 2013;7(8)
5. Bhunia R., Hutin Y., Ramakrishnan R., Pal N., Sen T., Murhekar M. A typhoid fever outbreak in a slum of South Dumdum municipality, West Bengal, India, 2007: Evidence for foodborne and waterborne transmission. BMC Public Health. 2009;9
6. Stroffolini T., Manzillo G., De Sena R., et al. Typhoid fever in the neapolitan area: A case-control study. European Journal of Epidemiology. 1992;8(4):539–542.
7. Aye T. T., Siriarayapon P. Typhoid fever outbreak in Madaya Township, Mandalay Division, Myanmar, September 2000. Journal of the Medical Association of Thailand. 2004;87(4):395–399.
8. Tran H. H., Bjune G., Nguyen B. M., Rottingen J. A., Grais R. F., Guerin P. J. Risk factors associated with typhoid fever in Son La province, northern Vietnam. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2005;99(11):819–826.
9. Luxemburger C., Duc C. M., Lanh M. N., et al. Risk factors for typhoid fever in the Mekong delta, southern Viet Nam: A case-control study. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2001;95(1):19–23.
10. Srikantiah P., Vafokulov S., Luby S. P., et al. Epidemiology and risk factors for endemic typhoid fever in Uzbekistan. Tropical Medicine & International Health. 2007;12(7):838–847.