

Indus Water Related Mortality and Morbidity due to Water Borne Diseases Outbreak in Hyderabad

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ABSTRACT

Introduction: Much of the ill health in developing countries is connected to unsafe drinking water. The number of sick people suffering from water borne diseases in a year is more than 2.5 billion out of this 2 million die. Diarrhea is top killer of children in Pakistan. River water is most polluted water and carries, chemical substances, pathogens, which cause water borne diseases. Indus river flows on the west of Hyderabad city. An outbreak of water borne diseases occurred in Hyderabad in 2004.

Objectives: To analyze epidemiological data of water borne outbreak in Hyderabad during 2004. To collect data from various hospitals and director general health record, admission of patients and their mortality. To calculate the case fatality rate of water borne diseases among the patients who were treated admitted in Hyderabad city hospitals.

Study Design: Epidemiological cross sectional study

Place and Duration of Study: This study based on the data pertaining to Indus water pollution which occurred in the summer month of 2004..

Materials and Methods: The study is epidemiological based on the data of water borne diseases due to Indus water pollution in Hyderabad city. Five hospitals where patients were admitted and 8 sites from where water samples were collected and tested. A special proforma and survey of hospitals and director general health Sindh reports were used for the study.

Results: There were 4979 patients who were admitted in big hospitals of Hyderabad. The laboratory report of the samples shows total dissolved salts 1536, coliform bacteria and conductivities parameters were unfit and above the permissible level of World health organization standards. Case fatality rate was 7.43 per thousand.

Conclusion: The major hospitals were the main facilities to treat the patients. Only the fresh water from Sukkur barrage and community awareness of using safe and alternative water in Hyderabad improve the water borne outbreak. The medical universities must create awareness for water borne diseases.

Key Words: Indus river, water borne diseases, Total dissolved salts, coliform, Hyderabad.

INTRODUCTION

River Indus is main supplier of drinking water to Hyderabad a second largest city of Sindh province with population of 2.9 million. Kotri Barrage was constructed in 1954 and flows from western boundary of Hyderabad. Hyderabad city is 75meter above sea level. The only river flowing in district is Indus. Hence any pollution in River causes water borne infectious diseases¹.

Much of the ill health in developing countries is connected to unsafe drinking water.

Providing safe drinking water to community can reduce typhoid and cholera mortality from 74.1% to 63.6% respectively. Water is contaminated when it carries pathogens and sewage and other waste materials. A person daily requires 150 to 200 liters of water. Paris was the first city that enjoyed the piped water as early as 1854. We consume 40000 liters of water in our life time². The water is responsible for over 900 different types of sicknesses. The number of sick people suffering from water borne diseases in a year is more than 2.5 billion out of this 2 million die³. Diarrhoea is

top killer of children in Pakistan³. River water is most polluted water and carries, chemical substances, pathogens, which cause water borne diseases. Indus river flows on the west of Hyderabad city. Its water was polluted in May 2004 due to polluted stagnant and toxic water from Manchhar Lake near Sehwan released by Irrigation Department without giving information to WASA Hyderabad. The main supplier of drinking water to Hyderabad city which directly pumps water from Indus river upstream and down stream of Kotri barrage Jamshoro. The Manchhar water polluted the Indus flow and reached 140 kilometer down at Kotri barrage upstream and Kotri and Latifabad downstream. Newspapers with headings reported large number of patients is suffering from diarrhea, vomiting, dehydration. The five major hospitals confirmed admission of large number of patients which started in the May and continued up to the end of July. The study was started under the department of Community Medicine and data was collected on daily basis. Water samples were also collected and tested in the MA Kazi Institute of Sindh University. The world health organization estimates 1 billion people lack access to

improved water supply sources. 2 million people die due to diarrhea because of unsafe water, hygiene and sanitation annually. 50 countries are facing cholera problems⁴. Infectious diarrhoea is the main contributor towards water borne diseases. The other water related diseases are cholera, salmonellosis, amoebiasis, shigellosis, protozoal and viral intestinal diseases⁵. 20% of the income of month is spent on treatment of diarrhoea by preventing diarrhoea the cost is less⁶. Water borne diseases are also major cause of child mortality^{7,8,9,10,11}. Hyderabad is second largest city in Sindh province and is 5th largest city in country by the World Gazetteer Retrieved 22 August 2012. In 1768 Hyderabad city was founded by Mian Ghulam Shah Kalhoro. Hyderabad is situated on the east bank of the Indus River and is about 150 kilometers away from Karachi^{12, 13, 14, 15}.

MATERIALS AND METHODS

It is epidemiological cross sectional study based on the data pertaining to Indus water pollution which occurred in the summer month of 2004. The water samples were collected from different sources

Water was collected from different sources and were tested in the two laboratories one of M.A Kazi Institute of Chemistry Sindh University and other for chemical parameters and second in Research and Diagnostic Laboratory Liaquat University of Medical and Health Science (LUMHS) in all 14 samples were tested and WHO guidelines were followed as reference criteria. Tests were conducted under qualified and experience personnel's. After the laboratory confirmation of chemical and bacteriological contamination study was expanded to hospital where patients were under treatment. Five government run large hospitals were included in the study as private hospital cooperation was difficult to achieve due to media and other administrative and logistics reasons. Data was collected on daily basis with cooperation of medical superintendents of these hospitals and also daily report from director general office.

Data from following hospital was collected through MPH and MBBS students who were trained in filling the proforma and data collection process. Their names are LUMHS, Patreetaab, Qasimabad and CDF hospitals, these four are located in upstream side while Kotri Talk Hospital and Shah Bhitai hospital Latifabad were located in down stream area. Data was fed in computer and analysis was done under SPSS software. The water samples were collected from 8 localities of Hyderabad and tested for bacteriological and chemical analysis.

Inclusion Criteria: The patients admitted in the selected government hospitals were included.

Exclusion Criteria: The private hospitals patients or unconfirmed patients were excluded.

RESULTS

Table 1 shows that there were 4979 patients who were admitted in big hospitals of Hyderabad, out of them 3319 (66.6) were admitted in the month of May, while 1660 (33.4) were admitted in the month of June.

Table 2 gives the data about the mortality which occurred due to water borne diseases as a consequence of Indus water pollution because this is the only source of water supply in Hyderabad. Out of 4979 admissions in the hospitals 38 died, which gives case fatality rate of 7.43 per 1000 patients.

Table 3 shows the laboratory report from 8 sites of Hyderabad, Latifabad and Kotri, and the world health organization (WHO) standard and the third column shows the status of fit and unfit of water for human consumption. The laboratory report of the samples showed the PH 8.5, total dissolved salts 1536, Most probable number of coliform per 100 ml of water which was 18 – 160 which conductivity was 2400 $\mu\text{S}/\text{cm}$ while WHO standard for PH is 6.5 – 8.5, TDS 500, coliform 10 and conductivity 900 $\mu\text{S}/\text{cm}$.

Table No.1: Month wise admission of patient in 5 major government hospitals of Hyderabad, Latifabad and Kotri

Month	Patients	%age
May	3319	66.6
June	1660	33.4
Total	4979	100

Table No.2: Showing patients' deaths and case fatality rate per 1000 patients

Data	Patients
Total patients admitted in hospitals	4979
Total deaths reported by hospitals	38
Case fatality rate per 1000	7.43

*. Source: D. G Health Hyderabad, May - June 2004
Research and surveillance committee report LUMHS 2004

Table No.3: Showing Laboratory Tests of water samples taken from Indus and Hyderabad City

Parameters	Laboratory results	WHO standard	Status
PH	8.5	6.5-8.5	Fit
Total Dissolved Salts (TDS) mg/L	1536	500	Unfit
Coliform/100ml water	18-160	10	Unfit
Conductivity $\mu\text{S}/\text{cm}$	2400	900	Unfit

Source: Prof. MY Khuhawar MA Kazi Institute of Chemistry Sindh University and Dr.Younus Dahar Research and Diagnostic Laboratory LUMHS Jamshoro June-2004

DISCUSSION

This study revealed that water borne outbreak hit the Hyderabad. The number of patients with water borne diseases especially with the symptoms of vomiting, diarrhea, dehydration rushed to the major hospitals for treatment and admission. There was emergency like situation. Total 4979 patients reported in these hospitals. 38 deaths occurred giving the case fatality rate of 7.43 per 1000. The water sources collected from 8 sites also confirmed the coliform bacteria, Total dissolved salts and conductivity parameters above the permissible level of WHO standards. The cause of this pollution was release of highly poisonous, polluted water from Manchhar Lake, 140 kilometer north west of Hyderabad, situated near Sehwan sharif on the right bank of Indus river, where polluted water from Punjab and Baluchistan was accumulating since many years while due to drought and low rain, the volume of Indus flow was reduced to the few cusecs. The 10,000 fresh water from Sukkur barrage was released when it reached to the Hyderabad and the closure of release of Manchhar lake water on the public pressure, was stopped, the situation improved and outbreak stopped which started in the month of May and ended in the June that is to say in Sixty days. The number of patients in May was 60% while in June 40% because public awareness and use of alternate water sources by Hyderabad citizens also helped in the reduction of admissions in the hospital. However, seven people were dying per thousand patients, mostly children and aged people were victim of this outbreak.

According to the World Health Organization, diarrheal disease accounts for an estimated 4.1% of the total DALY global burden of disease and is responsible for the deaths of 1.8 million people every year. It was estimated that 88% of that burden is attributable to unsafe water supply, sanitation and hygiene, and is mostly concentrated in children in developing countries.^{16,17,18,19,20}

CONCLUSION

The study concludes that the Hyderabad city water source from Hyderabad is vulnerable to water pollution especially from Manchhar Lake which is 140 km northwest. The outbreak patient load came on the major government hospitals which were not prepared for the outbreak. Only the fresh water from Sukkur barrage and community awareness of using safe and alternative water in Hyderabad improve the water borne outbreak patients condition, The loss of life and sickness burden was preventable for surveillance and monitoring Indus water and chlorination of water and sewerage board of Hyderabad.

Recommendations:

1. The pollution source in Hyderabad is Manchhar lake and low flow of fresh water from Sukkur barrage both points need engineering control and supply of safe and fresh water in the summer months as the water consumption due to high temperature and bacteriological growth increases leading to diarrhea and other water borne diseases.
2. Chlorination of the water of WASA round the year tested in laboratories round the year for bacteriological and chemical pollution.
3. Health Education against water borne diseases by the Liaquat medical university is recommended through department of Community Medicine and drinking water testing facilities be a regular activity of WASA and LUMHS.

REFERENCES

1. Government of Pakistan Census Organization, Census Report. Islamabad. 1998;1:21
2. Park JE. Text book of preventive and social medicine. 13th ed. Banarsidas Bhanot: Jabalpur India; 2004.p.367.
3. WHO workshop at Institute of Environmental Sciences, Karachi University: Workshop material; 2002.p.7.
4. Water Sanitation and Health, Facts and Figures on Water Quality and Health Available at: [electronic] http://www.who.int/water_sanitation_health/facts_figures/en/index.html Accessed [February 12- 2012]
5. Water, sanitation and hygiene, World Health Organization, Western Pacific Region. Available at: [electronic] http://www.wpro.who.int/health_topics/water_sanitation_and_hygiene/general_info.htm Accessed on [February 12 – 2012]
6. Schnabel B, Drastic consequences of diarrhoeal disease Available at: [electronic] <http://www.dandc.eu/articles/092423/index.en.shtml> Accessed on [February 12 – 2012]
7. Qureshi M, Water Born Diseases in Pakistan, Available at: [electronic] <http://cswatch.org/threat/water-born-diseases-in-Pakistan>. Accessed on [February 12 – 2012]
8. Altaf K, IES –Karchi Univeristy 2002.
9. Khuhawer MY, Laghari MH, Kolachi HB, Kazi MA. Institute of Chemistry Sindh University Report 17 May 2004.
10. Ilyas M, Text Book of Community Medicine and Public Health. 6th ed. Karachi;20004.p.371.
11. Government of Sindh Hyderabad, Directorate General Health Sindh, Report 19th June 2004.
12. Stefan H. "Hyderabad. World Gazetteer. Retrieved

13. Makhdum jehania safarnama[electronic]<http://www.uchsharif.com/>
14. Hazrat jahangshah UCH Sharif Trust available from: <http://www.pk.wowcity.com/hyderabad/pagecityinfo>
15. Sufis & Shaykhs – World of Tasawwuf [electronic] available from www.spiritualfoundation.net
16. WHO| Burden of disease and cost-effectiveness estimates [electronic] Available from <http://water.wikia.com>.
17. Lattimore, “The caravan routes of inner Asia” The Geographical Journal 72.6 (1928:500), quoted in Frances Wood, The Silk Road: two thousand years in the heart of Asia 2002:19.
18. Nwachuku N, Gerba CP. Emerging, waterborne pathogens: can we kill them all? Curr Opin Biotechnol 2004;15 (3): 175-80.
19. Dziuban EJ, Liang JL, Craun GF, Hill V, Yu PA, et al. (22 December 2006).”Surveillance for waterborne Disease and Outbreaks Associated with Recreational Water- United States, 2003-2004”.MMWR Surveill Summ 55 (12):1-30.
20. Petrini B. Mycobacterium marinum: ubiquitous agent of waterborne granulomatous skin infections. Eur J Clin Microbiol Infect Dis 2006;25(10): 609-13.

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