Assessment of Musi River Water and Nearby Ground Water: Impacts on Health of Down Stream Villages of Hyderabad

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Abstract

Objective: The present study focused on the MUSI River contamination and its impacts on health of downstream villages of MUSI in Hyderabad city. These pollutants are responsible for the degradation of aquatic ecosystems and groundwater resources.

Methods and Analysis: The areas from PEERIZADIGUDA to PRATAPASINGARAM selected for analysis which are located at down streams of MUSI River. Ground water samples are collected from each location and Physical, chemical and biological parameters are analyzed by using suitable methodologies of pH, Total dissolved salts, Turbidity, Total Hardness, chlorides sulphates and Biological oxygen demand water quality parameters are assessed. A study has made on these selected areas of population for health hazards due water born diseases by sampling method. Finding: This paper discuss about Environmental sanitation, water pollution constitutes a serious problem particularly in the mega cities. City like Hyderabad has seen rapid economic development and urbanization which lead to the burden of illness and severity of skin and communicable diseases in and around MUSI River due to its worst contamination in recent days due to poor hygienic and to explore the importance of treated water supply. Novelty/Improvement: Poor hygiene and polluted ground waters interventions are causing health hazards in these of areas. So, safe treatment of wastewater before disposal may sustain its natural environment and which can improve the self-purification of river and help in sustain river ecology.

Keywords: Health Problems, Hygiene and Sanitary, Water Pollution, Waste Water Treatment

1. Introduction

Water is a key source to sustain life on earth. The expansion of industrial development and urbanization in two last decades of Hyderabad city has not only increased water consumption considerably but also affected water quality. The city has no outlet source to dispose the waste water produced except to discharge into musi, which is an only source to discharge. Hence musi in this city has drastically changed its river ecology, which Even contaminated the ground water sources.

Musi River which is a tributary of River Krishna passes through Telangana state has good discharge and quality in the upstream. But when it reaches to down streams of Hyderabad city this river is within to be a sewerage drain. This is due to high sewerage disposal and pollutant from nearby industries. The Hyderabad city discharges about 600 million liters per day untreated sewerage water into Musi River. Even ground water sources are contaminated, the drinking water in entire area is brought from distant places; they were spending lots of money. The people who are residing in downstream are low economic standard. So they are force to consume these contaminated waters. The quality of water in Musi is degradation considerably. Hence the health problems in the downstream villages are witnessed. Health problems can because of pathogenic bacteria, viruses and parasites present in the wastewater. Hookworm infections are more common in agricultural workers who go barefoot in wastewater- irrigated fields.
This review was done to explore the impact of poor water treatment, hygiene, and sanitary interventions on health conditions, to diagnose the severity and ways to find out better solution to reduce health problems in downstream villagers. In this research a systematic study has carried out on surface and ground waters pollution in the Musi River Basin, to evaluate its contamination, and causes. Samples of water were obtained from individual water sources (wells) from villages and from surface water sources. Contamination from various sources pollutes ground water through leaching of organic and inorganic contaminates animal waste, domestic effluents and industry. The untreated municipal sewage and solid waste into water bodies increases nitrogen concentrations and sometimes can reach more than 60mg/l. The present study is an attempt to report a comparative account of health effects due to untreated municipal sewages, untreated effluent and water quality of the River Musi surrounding water ground.

People of downstream depend on ground water resources due to their low economic standards, Groundwater quality in these areas are degraded considerably. Ground water in these areas is used for various purposes. Groundwater pollution has been reported in many aquifers because of high concentration of organic and inorganic compounds in groundwater. These contamination lead too many diseases especially skin disorders, gastric disorders and allergies. More Health problems are witnessed in these areas, which priorities for the treatment and provision of drinking water. May reduce the health problems due to high dumping of sewerage and solid waste in the river Musi has led to Microbial contamination of drinking water remains a significant threat and constant vigilance is essential. untreated waste from different sources may alter the ecosystems and degrade them.

### 2. Study Area

The study area is located in the Hyderabad city of Telangana state, India, which is a downstream of Musi River in Hyderabad. The area falls in the Survey of India Topographic map number 56K/10 to a scale of 1:50,000. The area lies between 17° 22’ 58.8”N latitude and to 78° 39’ 39.276” E longitude. The area is located between PEERIZADIGUDA, PRATAPASINGARM the groundwater and river water samples are analyzed for physical, chemical and parameters. These samples are collected from bore wells of five locations:

PEERIZADIGUDA, RTC-COLONY, PARVATHAPURAM, MUTHYLAGUDA, PRATAPASIGARAM. Samples are collected from the following locations:

### 3. Methodology

Ground water samples are collected from each location and Physical Properties and chemical properties and biological parameters are analyzed by using suitable methodologies for, PH, TDS, Turbidity, Alkalinity, Total Hardness, chlorides sulphates, Nitrates BOD and COD water quality parameters are assessed.

<table>
<thead>
<tr>
<th>LOCATION/ PARAMETERS</th>
<th>PEERIZADIGUDA</th>
<th>RTC COLONY</th>
<th>PARVATHAPURAM</th>
<th>MUTHYLAGUDA</th>
<th>PRATAPASIGARAM</th>
<th>INDIAN STANDARD OF DRINKING WATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.97</td>
<td>7.83</td>
<td>8.23</td>
<td>7.89</td>
<td>8.51</td>
<td>6-8</td>
</tr>
<tr>
<td>TDS mg/l</td>
<td>1250</td>
<td>1820</td>
<td>2410</td>
<td>2175</td>
<td>2250</td>
<td>500</td>
</tr>
<tr>
<td>Turbidity NTU</td>
<td>8 NTU</td>
<td>7</td>
<td>7.3</td>
<td>7.56</td>
<td>8.2</td>
<td>10</td>
</tr>
<tr>
<td>Alkalinity (mg/l)</td>
<td>259</td>
<td>246</td>
<td>288</td>
<td>302</td>
<td>259</td>
<td>300</td>
</tr>
<tr>
<td>Total hardness mg/l</td>
<td>340</td>
<td>355</td>
<td>328</td>
<td>329</td>
<td>342</td>
<td>100</td>
</tr>
<tr>
<td>Chlorides mg/l</td>
<td>140</td>
<td>138</td>
<td>135</td>
<td>209</td>
<td>202</td>
<td>250</td>
</tr>
<tr>
<td>Sulphates mg/l</td>
<td>345</td>
<td>231</td>
<td>246</td>
<td>302</td>
<td>359</td>
<td>250</td>
</tr>
<tr>
<td>Nitrates (mg/l)</td>
<td>3.8</td>
<td>5.1</td>
<td>4.7</td>
<td>5.7</td>
<td>4.3</td>
<td>45</td>
</tr>
<tr>
<td>BOD (mg/l)</td>
<td>2.2</td>
<td>1.2</td>
<td>2.4 mg/l</td>
<td>2.3</td>
<td>2.6</td>
<td>3</td>
</tr>
<tr>
<td>COD ppm</td>
<td>69.3</td>
<td>120</td>
<td>87.2</td>
<td>112.3</td>
<td>102</td>
<td>250</td>
</tr>
</tbody>
</table>
A study has made on these selected areas of population for health hazards due water born diseases by sampling method

4. Results and Interpretation

\( \text{pH} \) of the study samples is in the range 8.51 to 7.81 PARVATHAPURAM and PRATAPSINGARAM ground water samples are beyond normal range of drinking waters 6-8 \( \text{pH} \) this may be due to the industrial effluents, sewerage discharges Results of various \( \text{pH} \) in the study areas is shown in the below. From Table 1.

**Total Dissolved Solids**, the presence of dissolved salts in the water samples collected from various locations of study area are shown in Table 1 range from 1250 to 2410, the results of shows very high amount of TDS which indicates that the water is contaminated with high amounts of inorganic matters which are either from commercial, industrial or domestic waste. This water may not suitable for direct consumption; these may create various health hazards like diarrhea, joint pains, skin allergies, gastrointestinal disturbances, and vomiting. The study areas are witnessed with more amounts of TDS mainly downstream areas PARVATHAPURAM, MUTHYLAGUDA, PRATAPASIGARAM has high TDS.

**Turbidity** and **Color** some samples are witnessed with slightly non transparent in color. Study area, results shows slight variations in turbidity From Table 1 ranges from 7 to 8.2 Areas PEERIZADIGUDA, PRATAPASIGARAM shows high turbidity. It is due to leaching of Musi River to ground water aquifer which contain high amount of organic and inorganic wastes. It may create health problems like diarrhea, gastrointestinal disturbances, and vomiting.

**Alkalinity** samples of study areas shows slightly high amount alkalinity which is beyond the limit of drinking water. Ranges from 246 mg/l to 302 mg/l high alkalinity in RTCCOLONY, MUTHYLAGUDA Excess Alkalinity in water is not good to consume and relatively not better and can cause Gastrointestinal problems.

**Total hardness** of the study samples is in the range 328 mg/l-355 mg/l ground water samples are beyond normal range of drinking waters Areas RTC-COLONY, PRATAPASIGARAM shows high limits of hardness. Results are shown in Table 1.

**Chlorides**: Chloride levels in the study areaare within the limits, results shown in Table 1 ranges from 136 mg/l to 209 mg/l. More levels are shown in areas MUTHYLAGUDA, PRATAPASIGARAM.

**Sulphates**: Study area shows high amounts of sulphates results are shown in Table 1 ranges from 231 mg/l to 359 mg/l PEERIZADIGUDA, PRATAPASIGARAM shows high amounts of sulphates it is due high discharge of domestic sewage which contain detergents. Sulphates induces the formation of sulphuric acid, Hydrogen sulphate and its man may be a cause for the gastrointestinal and skin allergies.

Nitrates Study area shows nitrates ranges from 3.8 mg/l to 5.7 mg/l results are shown in Table 1. Areas RTC-COLONY, PRATAPASIGARAM results are within the limit.

**Biological Oxygen Demand (BOD)**: Study area shows BOD from 1.2 mg/l to 2.6 mg/l which is within the limits more BOD in PARVATHAPURAM, PRATAPASIGARM in Table 1.

**Chemical Oxygen Demand (COD)** Study area shows COD ranges from 69.3 ppm to 120 ppm more concentration is found in areas RTC-COLONY, MUTHYLAGUDA results are within the limit. These concentrations in ground water are due to contamination of MUSI which is near to these downstream areas.

A random study has made for the analysis of health problems in the downstream villagers of MUSI to identify

### Table 2. Field survey conducted randomly on Jan15 to April-15 in the study area for health hazards

<table>
<thead>
<tr>
<th>Study Areas</th>
<th>Sample distribution</th>
<th>Skin diseases %</th>
<th>Diarrheic %</th>
<th>Arthis %</th>
<th>Gastro intestinal problems%</th>
<th>Skin allergies %</th>
<th>Malaria %</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEERIZADIGUDA</td>
<td>57</td>
<td>55</td>
<td>35</td>
<td>45</td>
<td>45</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>RTC COLONY</td>
<td>63</td>
<td>68</td>
<td>46</td>
<td>52</td>
<td>50</td>
<td>75</td>
<td>45</td>
</tr>
<tr>
<td>PARVATHAPURAM</td>
<td>43</td>
<td>46</td>
<td>32</td>
<td>56</td>
<td>44</td>
<td>68</td>
<td>48</td>
</tr>
<tr>
<td>MUTHYLAGUDA</td>
<td>65</td>
<td>54</td>
<td>37</td>
<td>55</td>
<td>34</td>
<td>85</td>
<td>55</td>
</tr>
<tr>
<td>PRATAPSINGARAM</td>
<td>85</td>
<td>86</td>
<td>52</td>
<td>65</td>
<td>48</td>
<td>83</td>
<td>58</td>
</tr>
</tbody>
</table>
the problems and impact of MUSI River on downstream villagers. Results or observations are tabulated in the Table 2. Results shows number of health problems like skin diseases, allergies and gastric disorders and parasitic fever like malaria. Arthis and other pediatric problems are also witnessed. People of these areas are less economic standards. So, they have satisfy with available ground waters and impact of pollution of MUSI River surrounding ground water which lead to health problems in down streams villagers of MUSI River.

5. Conclusions

Due to rapid development from last two decades in Hyderabad, large quantities of waste waters produced in the city, as there are no other outlet sources to dispose the wastewater. When untreated domestic sewage, Industrial Effluents are discharge into the dry bed of the MUSI River adversely impacting on the river ecology and on downstream villagers. Poor water quality had a negative impact on farmer health and undesirable for drinking purposes. Ground water is the primary source of water used in these areas, thus knowledge about its availability and sustainability are essential for the successful 

Management and future development of this limited resource. Ground-water availability and sustainability are influenced by many factors, one of which is water quality. Water quality generally has been over looked in these areas because the primary focus has been on obtaining a sufficient water supply.

The areas from PEERIZADIGUDA to PRATAPSINGARAM selected for analysis are located at down streams of Musi and the Musi conditions in these regions made worst due to heavy dumping of the organic waste, sewage from various sources from industrial and municipal waste. And the safe water supply for these areas is very less and people of these areas depend on ground water and poor hygiene, sanitary and polluted ground waters, interventions are causing health hazards in these regions. Thus, anthropogenic activity is a source of contaminants to the water table.

Untreated waste water at each sources level, treated before disposal can reduce pollutants, so safe treatment using advance scientific technology can reduce the load of pollution and accumulation of pollutants at the downstream.it also improves water quality and thus protects River ecology and thus minimizes health impacts on downstream villagers.

Sustainable developments like waste water treatment systems and natural techniques of filtration methods can sustain or help the environment surrounding of Musi, and from various skin and health hazards through water pollution.

6. References
