

## Water Quality Assessment of Peshawar City

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**Abstract** – Peshawar city has a large number of population with many congested areas. Like all major cities of the country, Peshawar also has a lot of challenges in provision of potable water to the end users which directly affects human health and consequently a large number of populations is suffering from water born diseases. This research study is conducted to analyse drinking water quality of Peshawar city. Total of 11 important water quality parameters including physio-chemical and biological parameters were studied for 18 different locations in city. It was found that throughout the city all the samples were almost safe from physical contaminations. However most of the locations were having chemical and bacteriological contaminations posing serious health risks to the users.

### I. INTRODUCTION

Safe drinking water is a need of every human being. In Pakistan, majority of population is using groundwater for drinking and the contamination of this source is one of the major concerns due to unplanned urbanization, industrialization, over exploitation of the natural resources and discharge of hazardous wastes into water bodies without proper treatment.

Numerous health problems can be directly concerned with toxic pollutants present in drinking water. In the province KP more than 6-m populations of Peshawar, Mardan, Charsadda and Nowshera districts have no access to clean drinking water. The remaining half draws their water from some 590 tube wells. Most of the wells are shallow and are liable to contamination with chemical and biological pollutants from the surrounding sources such as toilets, underground damaged sewerage lines and seepage of contaminated surface water. The study was carried out to assess the water quality of selected areas of Peshawar city for various physiochemical and biological parameters and health risks. The results were compared with the guidelines set by World Health Organization (WHO) and on the basis of result analysis recommendation were given for safety of drinking water.

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### II. LITERATURE

Research done by S.Adnan and J.Iqbal on the topic “Analysis of the groundwater quality in the Peshawar District”. Their research parameters were pH, Electric Conductivity, TDS, Hardness, Turbidity, Nitrate, Chloride. The findings of their research were that all the parameters except Nitrate and pH were found to be highly concentrated in the main city. The research done by Bushra et al... On the topic “Chemical Quality Assessment of Drinking Water in District Peshawar”. Their research parameters were Carbon Dioxide, TDS, Chloride, Chromium, Lead and Copper. The results of their research were that all the selected water quality parameters were beyond the WHO standards permissible limits except nitrates, chloride and total solids.

The research done by Saiqa Imran et al... on the topic, “Water Quality Assessment of district Nowshera, Charsadda and along the banks of River kabul” Their Research parameters were pH, TDS, Hardness, Cl, NO<sub>3</sub>, Turbidity, Total Coliform and E.Coli., Their research findings were all the parameters were almost with in safe limits except Total Coliform and E.Coli., which were found in high range throughout.

### III. METHODOLOGY

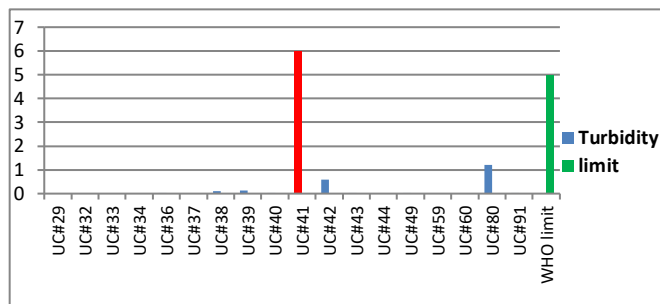
**Selections of Parameters:** On the basis of the literature reviews the parameters which were selected are pH, Turbidity, TDS, Hardness, Colour, Arsenic, Flouride, Nitrate, Sulphate, Magnesium, Chloride and Bacteriological Contamination (Fecal Coliform).

**Field Survey:** Field Survey was done along the town 3 and congested areas of the union councils of the town 3 were selected. Coordinates of all the sites were taken through GPS from which the water samples would be collected for analysis.

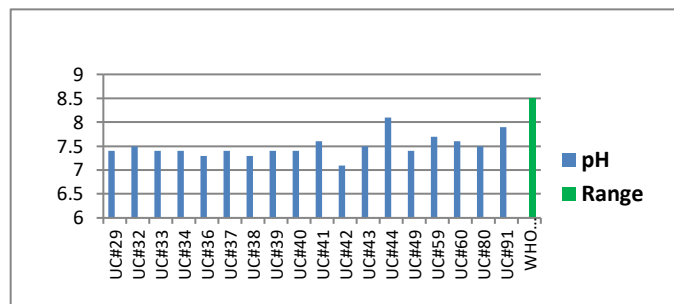
**Collection of Samples:** Drinking water samples were collected from all the selected sites and they were taken to lab for physiochemical and Biological Contamination.

### IV. EXPERIMENTAL WORK AND RESULT ANALYSIS

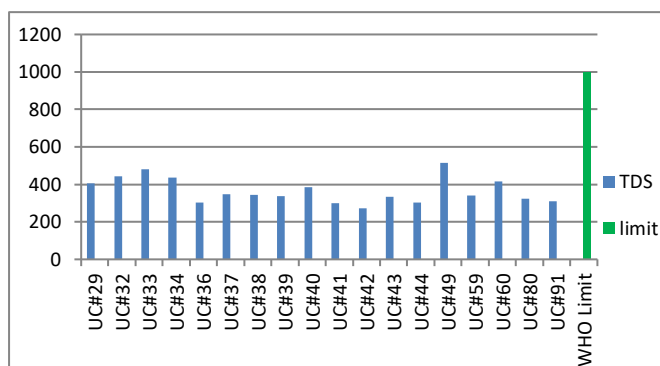
After the collection of samples all the the lab results of each site for all parameters were shown in separate graphs and were compared with WHO limits.



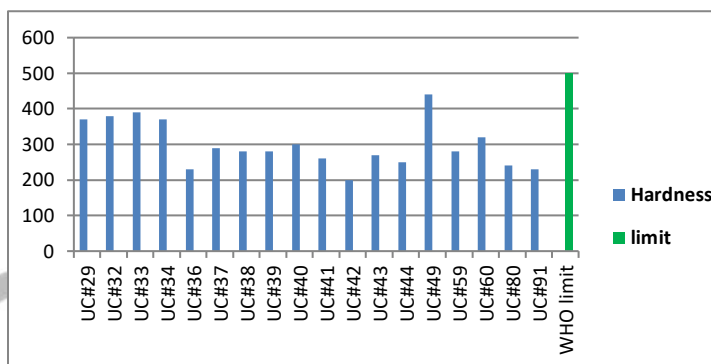
**Turbidity (WHO limit 5 mg/l)**



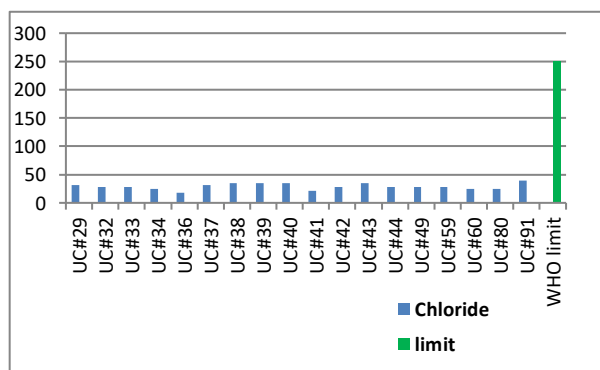
**pH (WHO limit 8.5 mg/l)**



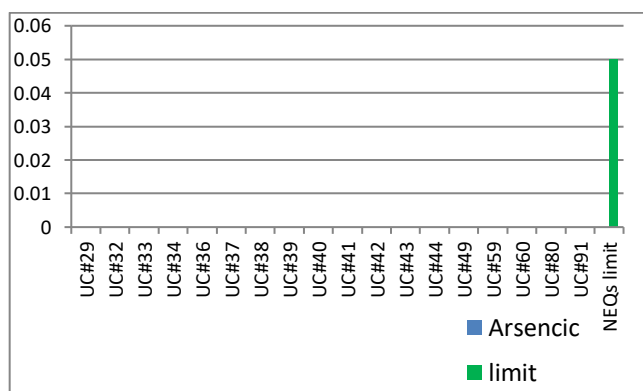
**TDS (WHO limit 1000 mg/l)**



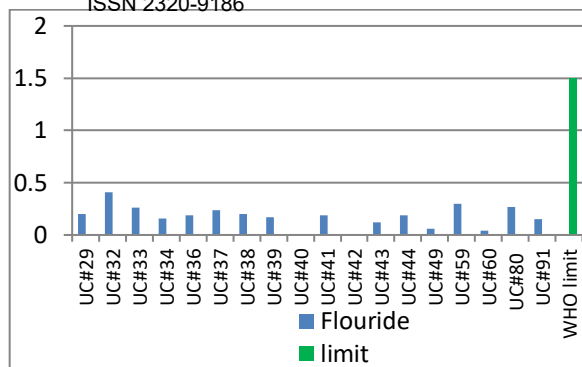
**Hardness (WHO limit 500 mg/l)**



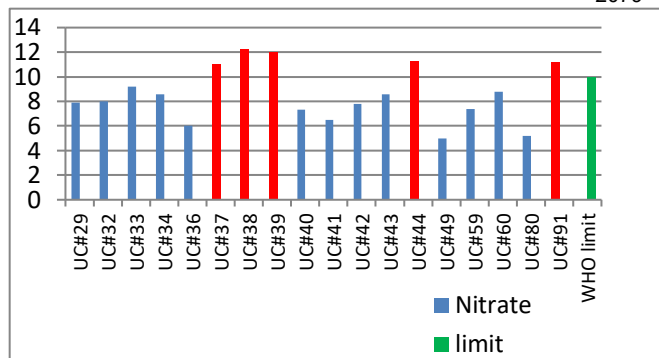
**Chloride (WHO limit 250 mg/l)**



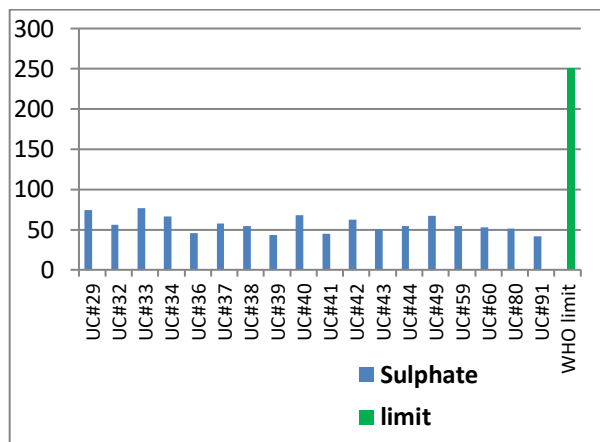
**Arsenic (WHO limit 0.05 µg/l)**



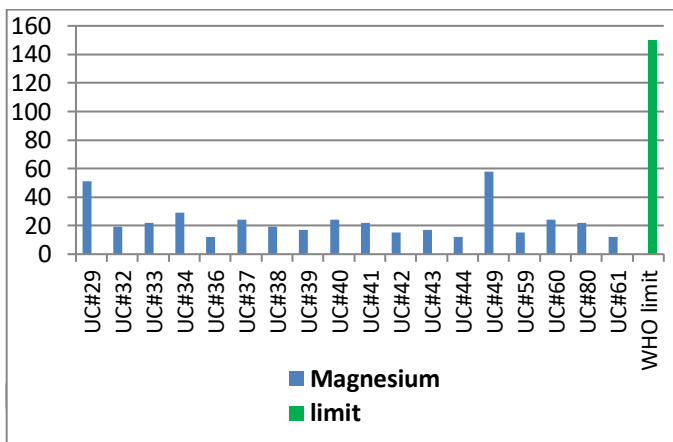
**Flouride (WHO limit 1.5mg/l)**



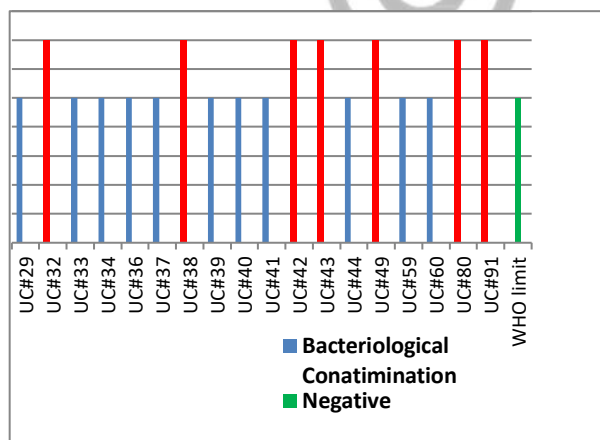
**Nitrate (WHO limit 10 mg/l)**



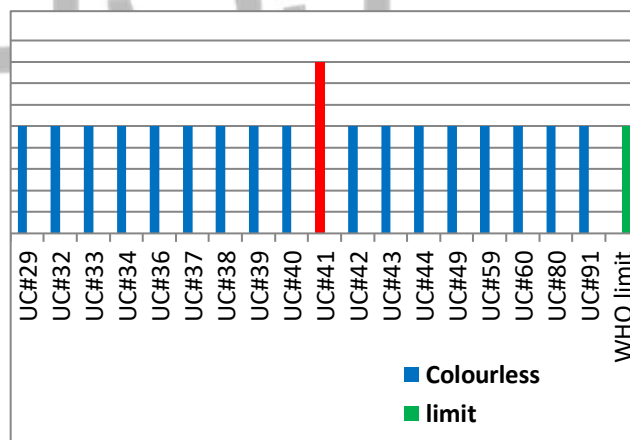
**Sulphate (WHO limit 250 mg/l)**



**Magnesium (WHO limit 150 mg/l)**



**Bacteriological Contamination (WHO limit, Negative)**



**Colour (WHO limit, Colourless)**

## V. CONCLUSIONS

- After the experimental work and result analysis , it was found that only seven sites has its drinking water quality fit for drinking while eleven sites were found to have its water unfit for drinking.
- Out of 18 samples, seven samples were found to have bacteriological contamination; four samples were found to have chemical contamination while only two samples was physically contaminated.
- It was also found that the chemical contamination was mainly due to the high amount of nitrate level in water, while physical contamination ,only at one site, was due to high turbidity level and the bacteriological contaminations indicates the presence of Fecal Coliform bacteria in drinking water.

## VI. RECOMMENDATIONS

- Industrial waste and food processing waste should be properly treated before discharging into surface water bodies because they can cause Nitrate contamination.
- Septic Systems and manures storage should be properly constructed so that do not leaks or mix with drinking water pipelines because they also cause nitrate contamination in drinking water.
- The mixing of fertilizers into ground or surface water should be controlled as the cause nitrate contamination to drinking water.
- The overflow of domestic sewage should be controlled as they cause bacteriological contamination when mix with drinking water pipelines.
- The water supply pipelines should be properly distributed so that water supply does not mix with human or animal waste because these are the major sources of Bacteriological Contamination (Fecal Coliform).
- Water distribution system needs to be completely replaced with high quality pipes.
- Domestic water storage tanks should be cleaned and disinfected on regular basis.
- Effective awareness programs regarding importance of water quality should be created involving mosques, educational institutions and mass media.
- Government should install filtration plants throughout the district for general public.

## REFERENCES

- Spatial Analysis of the Groundwater Quality in the Peshawar District, by S.Adnan & J.Iqbal  
<https://www.sciencedirect.com/science/article/pii/S1877705814000058>
- CHEMICAL QUALITY ASSESSMENT OF DRINKING WATER IN DISTRICT PESHAWAR by Bushra et al...
- <https://www.semanticscholar.org/paper/CHEMICAL-QUALITY-ASSESSMENT-OF-DRINKING-WATER-IN-Iftikhar-Bashirullah/27cea95b0ac7b560b74cef10081b4acb45be75c0>
- Water quality assessment report of District Nowshera, Charsadda and along the banks of River Kabul by Saiqa Imran et al.... through PCRWR (Peshawar) in March 2018.
- Summary report of water quality assessment survey of “Clean Drinking Water For all Projects” Khyber Pakhtunkhwa (Volume II, book) through PCRWR in ministry of Science and Technology, Government of Pakistan.