Assessment of Levels of Turbidity in Water from Different Supplies and their Comparison with Different brands of Mineral Water

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***Abstract*--** Safe **water is a precondition for health and development and a basic human right, yet it is still denied to hundreds of millions of people throughout the developing world. Water related diseases caused by insufficient safe water supplies. Despite continuing efforts by governments, civil society and the international community, over a billion people still do not have access to improved water sources. Water samples collected from different areas of Quetta and different brands of mineral water samples were collected from market in Quetta district. Results showed that turbidity condition in point 1 was worse while other points had turbidity values within WHO guideline values.**

INTRODUCTION

Water is blessing of Allah. In Holly Quran, Almighty Allah says, we send done from sky water in measure and we allow it settle down deep into earth. It is nature's most wonderful, abundant and useful compound and it is the basis of all lives-ecological resources for the flora and fauna of our earth and a fundamental necessity for all lives. Without a properly functioning water supply, it is difficult to imagine productive human activity, agriculture or forestry, livestock, farming or fisheries, trade or industry [1].

Water is our lifeline that bathes us and feeds us. In ancient cultures water represented the very essence of life. Water has played a role not only in the history of countries, but in religion, mythology and art. Water provides the earth with the capacity of supporting life. An organism does not have to be told how important water is to their existence. An amphibian knows to lay eggs in water and anywhere else there will be no new born. Even flies know to lay their eggs in fresh water.

The only organism that does not understand the importance of water is humans, especially in industrialized countries. Children in those societies turn on the water in a sink and never think about the trouble someone has gone for that miracle to occur.

Essential to life, a person's survival depends on drinking water. Water is one of the most essential elements to good health. It is necessary for the digestion and absorption of food, helps maintain proper muscle tone, supplies oxygen and nutrients to the cells, rids the body of wastes, and serves as a natural air conditioning system.

With two third of the earth's surface covered by water and the human body consisting of 75 percent of it, it is evidently clear that water is one of the prime elements responsible for life on earth.

There is clear and convincing evidence that the world faces a worsening series of local and regional water quantity and quality problems, largely as a result of poor water allocation, wasteful use of the resource, and lack of adequate management action. Water resources constraints and water degradation are weakening one of the resource bases on which human society is built. Water use has been growing at more than twice the rate of the population increase during this century. About one third of world's population lives in countries that are experiencing moderate-to-high water stress partly resulting from increasing demands from a growing population and human activities. By the year 2025, as much as two-third of the world population could be under stress, conditions [2]. It is not only quality that has to be preserved but also quantity.

Drinking water is derived from either surface water or ground water. Surface Water can be contaminated through direct or indirect emissions pollutants and ground water can be contaminated by leaching from the soil [3].

The degradation of water quality in many ground waters of Europe is a major source of concern. Increase in turbidity and nitrate concentration is a potential threat for the quality of drinking water in rural areas. As turbidity is caused by the suspended of certain matter, such as clay, slit colloidal organic particle and other microscopic organisms. Turbidity is an ability of certain light scattering and light absorbing property of water. Michael (1982) [4] reported that turbidity of water is important for water quality treatment such as coagulation, settling and filtration of un-dissolved substances. Nebbache et al (2001) [86] suggested that turbidity or nitrate concentration peak during heavy rain episodes. WHO (1996 a) [6] reported that turbidity in excess of guideline values 5 NTU is objectionable to consumer. The perception of higher turbidity in water at the consumer's tap than in that entering

the distribution system may indicate post-treatment contamination, corrosion, or other distribution problem. Betancourt and De-edesma (2000) [7] detected higher turbidity 6 NTU in the finished water indicating poor operation of filters and interference with disinfection.

Results and Discussion

There was a highly turbidity difference between water samples collected from Quetta and mineral water samples. The minimum turbidity range of well water samples from 0.5 to maximum 30 NTU. The turbidity of well water sample of point 1 was very high than WHO guideline values. The minimum turbidity rang for tap water sample was 0.8 to maximum 8 NTU. The turbidity of tap water of point 1 was 8 which was high than the WHO guideline values. The turbidity of mineral water samples having minimum range from 0.1 to maximum range of 11.1 NTU which was high than the WHO guideline values.

The present study was intended to check the quality of water used by urban population of Quetta for drinking purpose. The population constitutes mostly of low income class and they cannot afford mineral water available in market for infants and patients. Authorities are responsible for the quality and quantity of water they are supplying. Due the shortage of water, people have installed privately a large number of bore holes, wells and tube wells. However, it is a fact that there is no guidance from government side for these installations because common man doesn't know about depth of digging, strata penetration, lining and other materials etc. As the private borings are usually shallow and the quality of their water is not satisfactory [8].

Tube wells installed by the government are very old, that's why the quality of water is gradually worsening. Turbidity of water samples collected from sumungli housing scheme was 30 NTU. The high value of turbidity is due to the leaching from the soil. However, WHO guideline value for turbidity is 5 NTU. In addition, the turbidity of one sample of mineral water was 11.1 NTU. It shows that there is no check and balance from government side on this serious issue.

In 1999, Power and Nagy [9] determined the relationship between bacterial growth and some physical and chemical parameters within Sydney's drinking water distribution system. Their results showed that certain parameters such as turbidity and distance from the initial treatment point correlated with the presence of high bacterial number.

High turbidity values found at consumer's end must be due to the suspension of sediments in the distribution system [10]. Another reason may be storage of water prior to usage and tank cleaning is not a usual practice.

Table I
Turbidity of different water supplies of Quetta

location				
S.No.	Name of site	Sample I.D	Depth	Turbidity
1	Point 1	Pw-1	600 ft	3.0
2	Point 1	Pt-1		8.0
3	Point 2	Pw-2	800 ft	3.0
4	Point 2	Pt-2		2.0
5	Point 3	Pw-3	80 ft	1.0
6	Point 3	Pt-3		1.0
7	Point 4	Pw-4	1000 ft	0.5
8	Point 4	Pt-4		0.8

Table II
Turbidity of mineral water samples

S.No.	Mineral water samples	Turbidity
1	Point 5	0.1
2	Point 6	0.6
3	Point 7	0.3
4	Point 8	11.1

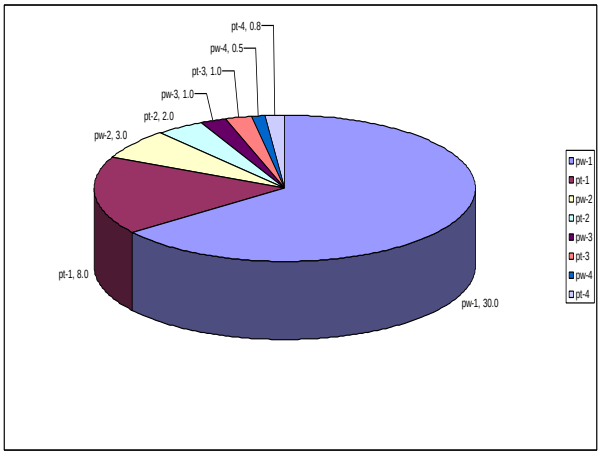

Fig. 1. Comparison of Turbidity among different supplies of Quetta

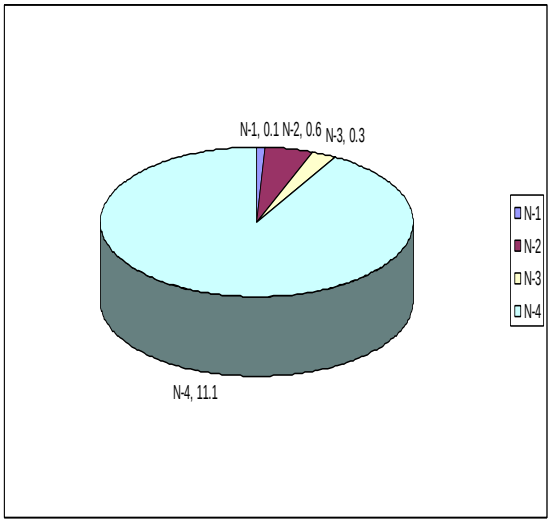

Fig. 2. Comparison of Turbidity among mineral water samples

MATERIALS

Reagents.

Water samples, Turbidity standard

Procedure.

Turbidity meter (Lovibond) was used to determine the turbidity of all water samples collected from various points. Prior to this determination, turbidity meter was calibrated by different standards having turbidity 1, 10, 100, 1000 NTU. After that turbidity of all water samples were determined.

REFERENCES

[1] R.K. Tatawat and C.P. Singh. Quality of ground water of Jaipur city and its suitability for domestic and irrigation purpose. India. *Applied Ecology and Environmental research*, **6**, 2:79-88. (2007).

[2] M. Ahmed. Speech In: Proceedings of national work shop on water resources achievements and issues in 20th Century and challenges for the next millennium. 28-30:12 (1999).

[3] M.S. Holt (Ed); G. Eisenbrand (Ed); M. Hofer (Ed.); R. Kruse (Ed); L. Shuker (Ed). Sources of chemical contaminants and routes into fresh water environment. *Food and Chemical Toxicology*. 38:521-527. (2000).

[4] J.S. Michael. Examination of water for pollution control. Vol-2. First Edition World Health Organization, Regional office for Europe, Copenhagen, Denmark. (1982).

[5] Nebbaches; V. Feeny; I. Poudevinge; D. Alard. Turbidity and nitrates transfer in Karstic aquifers in rural areas. The Brianne Basin case study. *Journal of Environmental Management*, **62**, 2: 389-398. (2001).

[6] WHO. Guideline for drinking water quality Recommendation. Vol.**1**:16-17, World Health Organization, Geneva Switzerland. (1996a).

[7] Q.Q.W. Betancourt; I.B. De- Ledesma. Descriptive study on the presence of protozoan. Cysts and bacterial indicators in a drinking water treatment. Plant in Maracaibo, Venezuela. *International journal of environmental Health research.* **10**, 1: 51-61. (2000).

[8] K.I.I. Gelberg; L. Church; G. Casey; M. London; D.S.Roerig; J. Boyd; M. Hill. Nitrate Levels in drinking water in rural new York state. *Environmental research,* **80,** 1 - 3:34 - 40. (1999).

[9] K.N.Power; L.A.Nagy. Relationship between bacterial re- growth a physical and chemical parameters with in Sydney's drinking water distribution. *Water Research*, **33**, 3:741-750. (1999).

[10] WHO Guideline for drinking water quality. vol. **2**, (2nd edn.) World Health Organization, Geneva Switzerland. (1996).

[11] S. Hayder; M. Arshad and J.A. Aziz. Evaluation of drinking water quality in ueban areas of Pakistan. A case study of southern Lahore. *Pak. J. Engg & Appl. Sci*, vol 5; 16-23. (2009).

[12] M. A. Kahlown; M. A. Tahir; H. Rasheed and K. P. Bhatti. Water Quality Status, National Water Quality Monitoring Programme, Fourth Technical Report. Pakistan Council of Research in water Resources, (2006).

[13] A. Azizullah; M.N.K. Khattak; P. Richter; D. P. Hader. Water pollution in Pakistan and its impact on public Health- A review. *Environment International*, 37: 479-497. (2011).