Physico-chemical analysis and determination of heavy metals in drinking water of union council, Islampur, Swat

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In Pakistan, majority of population is using ground, tube wells and spring water for drinking purposes. The contamination of these water bodies is a big challenge for safe drinking water quality due to high concentration of toxic elements.

The study was conducted with objectives to assess the drinking water quality, a human health criterion and the concentration of a pollutant in water and different heavy and light metals intake and exposure is expected to pose a significant problem to human health of the union council Islampur, district Swat. Forty samples were collected from different sources i.e. tube wells, springs, open wells and tap water. These samples were analyzed for various physico-chemical parameters and their minimum and maximum value are given with each parameter, such as pH (5.98 to 7.55), conductivity (13.5-699), dissolved oxygen (DO) (3.17-3.23), salinity (0.01-0.03), total dissolved solid (TDS) (527-633), total suspended solids (TSS) (5-10), alkalinity (69.3-404), hardness(132.8-798), chloride (4.7-173), and phosphate (000). The samples were also analyzed for light and heavy metals such ascalcium (Ca)(21.25-141.72), magnesium (Mg)(111.55-655.08), sodium (0-5) (Na), potassium (K) (1-8), lead (Pb) (1.657-0.415), chromium (Cr) (0.112-0.25), zinc (Zn) (0.002-2.381) and Nickel (Ni) (0.029-0.090) respectively. The results were compared with Pak-EPA, US-EPA and WHO standards and some of the elements were exceeding their permissible limits such as E.C 50%, TDS78%, TSS78% Hardness18-80%, calcium70%, magnesium45-70%, alkalinity87%. The results indicatethat the overall situation of the drinking water quality of union council Islampur district Swat is not satisfactory according to the Pak-EPA and WHO (2004) standards.

The study indicates that human health problems in Islampur, Swat area are associated with high concentration of heavy metal concentration and is the main reason for the cause of high risk to the majority of population in the area.