Physico-chemical and microbial studies of the drinking water of union council Gandheri, District Nowshera, Khyber Pakhtunkhwa, Pakistan

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Abstract

The present study investigates hydrochemical and microbial concentrations in the drinking water of selected villages in the Union Council Gandheri, district Nowshera, located in the Peshawar Basin. A total of 49 drinking water samples were collected from Thordher, Behram Kally, Chehel Banda and Kalinger areas of District Nowshera using standard procedures. These samples were analyzed for physico-chemical (pH, alkalinity, total dissolved solids, F, Na, K, Ca, Mg, As, Cl, HCO_3, CO_3, NO_3, SO_4) and biological parameters (total colliform, fecal colliform, E-colliform) using standard procedures. Among these, the nitrates (0.5-35 ppm) and flouride (0.37-7.9 ppm) exceed the permissible limits set by WHO. Similarly the turbidity (0.2-755 NTU) in 16 samples and total dissolved salts (239-1380 ppm) in 4 samples have anomalous concentrations. The rest of the physico-chemcial parameters are within the permissible limits of WHO standards. Moreover, the higher concentrations of fecal colliform up to 130 MPN/100 ml and total coliform up to 900 MPN/100 ml with positive E-Colliform, in most of the studied samples, confirm microbial contamination in drinking water sources of the area.

The elevated concentrations of fluoride, nitrates, dissolved salts, and microbes is causing serious health hazards as indicated by the occurrence of dental fluorosis, joint pain, dysentery, diarrhea and various other water borne diseases among the inhabitants of the study area in general and the children in particular. The presence of fluoride containing minerals and finer sediments, in lacustrine and alluvial deposits of the study area, are considered to be the main contributors of fluoride and tubidity in groundwater sources. High amount of nitrates may have been contributed from the fertilizers, human and animal wastes.

It is, therefore, suggested that the supply of clean drinking water may be ensured on urgent basis for the eradication or control of various water related health hazards in the studied villages. Further more the inhabitants of the area needs to be properly educated through various trainings for the sustainable utilization of drinking water resources.