Abstract

The supply of hygienic, safe and abundant drinking water is essential for the good health of humans. Since ancient times, a number of anthropogenic activities have resulted in the spreading of toxic heavy metals into our environment. Water, food and soil are considered as the key sources of relocation of toxic heavy metals to humans, plants and animals. These metals are non-biodegradable so they accumulate indeterminately in the environment and resulted in stern eco-toxicological problems. This needless accumulation and intake of heavy metals by the human resulted in severe health problems, which including the kidneys, lungs and central nervous system problems. To better comprehend the transmission of heavy metals from water to the human body, it is important to measure the concentrations of these heavy metals in water facilities. The keratinized tissue (nail, hair etc.) is a recorder of both environmental and dietary information, which can disclose terrestrial information. These tissues are also a bio-monitor or bio-indicator of exposure to different environmental contaminants and can be utilized to explore paleo-climatic variation. Therefore, keratinized tissues such as hair/nails can be significant in different forensic studies, particularly as associated with environmental contamination or geographic provenance. The human hair is considered as a metabolic by-product that integrates heavy metals into its internal morphology during the process of growth. The nail of human is a horn-like envelope that covers the dorsal side of the terminal phalanges of toes and fingers in humans, mammals and some other primates. The examination of different keratinized matrices, such as hair/nails has attained a significant importance in forensic toxicology and diverse substances can be identified for a bigger time frame than in usual specimens i.e. urine and blood. The analysis of hair is consistently useful for the retrospective long-term observation of differently expended substances. The nails are considered as a substitute matrix to hair, but the submission of nail study still has to be assessed in a broader extend. The estimation of heavy metal content in hair/nail samples states a significant part in exposure assessment and this estimation has been discovered as a means for evaluating the influence of environmental contamination. Atomic absorption spectroscopy is one of the most commonly used utensils in analytical chemistry. This is due to the estimation of metals and the adequate sensitivity that this technique offers for numerous applications and it is comparatively interference free analytical

technique. In this present study six heavy metals (Pb, Cd, Cr, Ni, Zn, As) were analyzed in drinking water samples and in hair/fingernails of school children/staff in District Lahore. Later, the prevalence of different heavy metals in hair and nails with respect to their concentration in consumed water was also correlated by Pearson correlation analysis. The overall mean concentration levels in drinking water samples were in the following order Zn > Cr > Ni > Pb > Cd > As. The mean concentration of accumulated heavy metals, analyzed in head hair samples of overall study sites was in the following order of Zn > Pb > Cr > Ni > As > Cd. Similarly, the accumulated mean concentration of heavy metals, analyzed in samples of fingernails of overall study sites was in the following order of Zn > Pb > Cr > As > Ni > Cd. Higher concentrations of heavy metals in hair samples were observed in 25-36 years males. Whereas, higher concentrations of heavy metals in nail samples were observed in 6-11 years and 12-17 years males. Pearson correlation coefficients for concentrations of six different metals in drinking water and hair/fingernail samples were well above 0.5, which representing that consumption of drinking water could be ascribed as a main factor in the amassing of heavy metals in the hairs/fingernails.