

Title: Determination of levels of essential elements, lead and lead risk exposure factors in adult males using finger nails and scalp hair

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Essential elements are those elements which even in small amounts play important roles as far as healthy animal or plant life is concerned. Lead is a heavy metal with no known biological function in the body. Various biopsy materials for example teeth, scale, blood and other body fluids have for a long time been used to assess Pb exposure as well as the levels of essential elements in the body. Hair and nails are more attractive indicators since the analysis is economical and not susceptible to contaminations. Studies have identified males as special risk group to deficiency because they are poor eaters of foods considered essential and for good health yet they work in areas that expose them to high levels of lead. The Pb pollution and its health effects currently facing developing countries requires the concentration of Pb in the paired samples of finger nails and scalp hair of the same subject to be examined using the same methods so as to investigate whether there is a correlation of Pb with the essential elements. There are several risk factors that may affect the levels of essential elements and Pb inhuman males including age, nature of work, place of residence and dietary factors. The study therefore examined the concentration of Zn, Fe, Mg, Ca and Pb in the paired samples of finger nails and scalp hair of the males of ages between 18-50 years (n=200) using atomic absorption spectroscopy (AAS). The concentration of these metals in the hair were compared with the paired samples of finger nails of

Abstract: the same subject (n=200). The risk factors were assessed using a questionnaire whose results were compared with the other results from the study. The data obtained in this study was analyzed using ANOVA and t-test. The mean levels of Pb ranged from 50-480 ug/g, and 30-410 ug/g in nails and hair respectively, Zn levels ranged from 40-490 ug/g and 30-450 ug/g in nails and hair respectively, Fe levels ranged from 60-555 Jlg/g and 20-520 ug/g in nails and hair respectively, Mg levels ranged from 90-800 ug/g and 100-935ug/g in nails and hair respectively while Ca levels ranged from 250-1860 Jlg/g and 130-1280 ug/g in nails and hair respectively. The results showed that the levels were significantly higher in the finger nails than in the scalp hair except Mg which was higher in the scalp hair. Other factors found to have significant influence on Pb and essential element levels in hair and nails included: age, area of residence, distance from busy roads or industry, smoking, use of glazed ceramics, occupation, dietary habits and sources of water among others. The study also observed that high levels of Pb in the finger nail or scalp hair had a negative correlation with Ca and Zn. The results of this study will be used to recommend the use of hair and nails as bio-indicators of essential element status and lead overload instead of blood. It is hoped that the results obtained will be used by relevant authorities to formulate policies for appropriate action. The results can also be used by nutritionists to advice on good dietary habits and also to sensitize. The public, especially males.