

Trace Elements in Scalp Hair of Leukaemia Patients

This study aimed to determine the concentrations of Fe, Ni, Cu, Zn, and Pb in the scalp hair of leukaemia patients and healthy volunteers using an optimized XRF method. Hair samples were categorized based on the type, growth, and age of participants. Results showed that trace elements (TEs) in both groups were positively skewed. Leukemia patients had lower Fe, Cu, Zn, and Pb levels but higher Ni levels compared to controls. The Mann–Whitney U-test showed no significant differences between leukaemia subgroups and controls. However, significant differences (p < 0.05) were found for Pb, Cu, Ni, and Fe between leukaemia patients and controls. Strong correlations (r > 0.70) were observed among TEs in both groups, with all being significant at p < 0.05. Principal component analysis (PCA) indicated that the type and growth of leukaemia had a greater impact on element loading than age. *Ali Khuder, et al.* NUKLEONIKA. 2014;59(3):111 \mathbb{Z} 120

Level of Essential and Toxic Metals in Urban Adolescents Hair: Preliminary Study.

The objective of this study is to monitor essential metals including calcium (Ca), copper (Cu), iron (Fe), magnesium (Mg), nickel (Ni), and zinc (Zn), as well as xenobiotics, as well as toxic metals such as arsenic, cadmium, and lead in the hair of boys aged 12-13 from different cities in Salerno province. This preliminary study explores possible relationships between diet and local environmental pollution. The experimental data showed significant differences in metal levels by sex. Concentrations were determined using atomic absorption spectrometry after washing and mineralization. Notably, lead levels in schoolboys' hair were 1.50 g/g (Salerno) and 1.44 g/g (Solimena), with high nickel levels at Solimena (2.79 g/g) and unsafe arsenic levels at Scafati (2.47 μ g/g). Two-way ANOVA indicated a significant interaction between sampling site and sex on arsenic and nickel levels, and effects on cadmium, calcium, copper, lead, and magnesium levels (P<0.05). Hair metal levels suggest varying exposure to essential and toxic metals among populations. *De Prisco P.P. et.al. Biomedical Research 2010; 21 (2): 131-140. Consiglio Nazionale delle Ricerche - Istituto di Scienze dell'Alimentazione, via Roma 52°/c, 83100 Avellino, Italy; Department of Pharmaceutical Sciences, University of Salerno, via Ponte Don Melillo, 84014, Fisciano (SA), Italy.*

Interaction Between Carcinogenic and Anti-Carcinogenic Trace Elements in the Scalp Hair Samples of Different Types of Pakistani Female Cancer Patients.

Carcinogenic processes have been observed to be linked with imbalances in essential trace and toxic elements within human body fluids and tissues. This study aimed to investigate the relationship between carcinogenic elements—arsenic (As), cadmium (Cd), and nickel (Ni)—and anti-carcinogenic elements—selenium (Se) and zinc (Zn)—in the scalp hair of female cancer patients with breast, cervix, mouth, and ovarian cancers.

Methods

- Sample Collection: Scalp hair samples were obtained from cancer patients and referent female subjects of the same age group and socioeconomic status.
- Preparation: The hair samples were oxidized using 65% nitric acid and 30% hydrogen peroxide in a microwave oven.
- Analysis: Metal concentrations were analyzed using atomic absorption spectrometry.
- Validation: The accuracy and reliability of the methodology were verified using certified reference material of human hair (BCR 397).

Results

- Carcinogenic Elements: Mean concentrations of As, Cd, and Ni were significantly higher in the scalp hair of cancer patients compared to referents.
- Anti-Carcinogenic Elements: Zn and Se levels were significantly lower in cancer patients compared to referents (p < 0.01).

Conclusions

The study demonstrated that elevated levels of heavy metals such as arsenic, cadmium, and nickel, alongside reduced levels of essential trace elements like selenium and zinc, are associated with an increased risk of cancer. This highlights the critical role of trace and toxic element imbalances in carcinogenic processes. *Sham Kumar Wadhwa, et. al. Clinica Chimica Acta.* (2015) 178–184. *Center of Excellence in Analytical Chemistry, University of Sindh, Jamshoro 76080, Pakistan.*

Hair Zinc Levels and the Efficacy of Oral Zinc Supplementation in Children with Atopic Dermatitis

Introduction

Atopic dermatitis (AD) is a chronic inflammatory skin condition that affects patients of various age groups, characterized by pruritus, eczematous lesions, and disrupted barrier function. Zinc, an essential trace element, plays a critical role in skin health, immune function, and inflammatory regulation, making its deficiency a potential factor in the pathophysiology of AD. However, the role of zinc supplementation in managing AD remains controversial, warranting further investigation.

This study aimed to explore zinc deficiency in children with atopic dermatitis and evaluate the efficacy of oral zinc supplementation in alleviating the symptoms of the condition.

Participant Selection

The study involved 101 participants, including 58 children diagnosed with atopic dermatitis and 43 healthy controls, aged between 2 and 14 years.

Baseline Zinc Measurement

Hair zinc levels were measured in all participants to assess zinc deficiency. The mean levels of zinc were compared between the AD group and the control group.

Zinc Supplementation Protocol

AD patients with reduced hair zinc levels were divided into two groups:

- Group A: Patients receiving oral zinc supplementation for eight weeks.
- Group B: Patients not receiving supplementation.
- Assessment Tools

The efficacy of zinc supplementation was evaluated using the following metrics:

- Eczema Assessment Severity Index (EASI): A standardized tool to measure eczema severity.
- Transepidermal Water Loss (TEWL): An objective measure of skin barrier function.
- Visual Analogue Scales: Subjective assessments of pruritus and sleep disturbances.

Results

• Zinc Levels

At baseline, the mean hair zinc level was significantly lower in AD patients compared to controls (113.1 μ g/g vs. 130.9 μ g/g, p = 0.012), confirming zinc deficiency in the AD group.

Impact of Zinc Supplementation

Significant improvements were observed in patients receiving oral zinc supplementation (Group A) after eight weeks:

- Hair zinc levels increased significantly (p < 0.001).
- EASI scores showed greater improvement in Group A compared to Group B (p = 0.044).
- TEWL measurements improved significantly (p = 0.015).
- Visual analogue scales for pruritus and sleep disturbances demonstrated marked improvement (p < 0.001).

Discussion

The findings suggest a strong correlation between zinc deficiency and the severity of symptoms in atopic dermatitis patients. Zinc supplementation effectively alleviated eczema severity, improved skin barrier function, and reduced pruritus and sleep disturbances in patients with low zinc levels. These results highlight the potential of targeted zinc supplementation as a therapeutic approach in zinc-deficient AD patients.

Conclusion

Oral zinc supplementation may offer significant benefits for patients with atopic dermatitis who exhibit zinc deficiency. While this study provides compelling evidence for its efficacy, further research is needed to establish standardized guidelines for zinc supplementation in managing AD.

Future studies should explore:

- Long-term effects of zinc supplementation on AD management.
- Optimal dosages and formulations for zinc therapy.
- The interplay of zinc with other trace elements and nutrients in skin health.

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