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Serum Zinc Concentration and Acute Diarrhea in Children from Different Regions of Uzbekistan

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Objective

To study the blood serum zinc concentration in children with acute diarrhea (AD) in in-patient facilities before and after therapy.

Introduction

There are several reports of zinc deficiency in pathogenesis of acute and chronic diarrhea. The literature review showed children with diarrhea and chronic gastroduodenitis performed zinc deficiency in majority of cases (1). The normal values of zinc in blood serum are 12.8-27.8 μmol/l (2). There is a threshold of 13μmol/l zinc concentration for zinc deficiency diagnosis. The zinc level 8.2 μmol/l and below is poor prognostic criteria (3).

Methods

Totally 102 children (1-14 years old) with AD in in-patient facility from different regions were studied for serum zinc concentration before and after treatment. Termez and Saraosie cities are located in south of Uzbekistan, in the region with high negative impact from the nearly Tajikistan located aluminum producing plant. The serum zinc level measured by neutron-activation method in the Institute of Nuclear Research (INR).

Results

The zinc concentration in serum significantly varied by the region (Table 1).

The level of zinc in children from Tashkent estimated at lower normal limit with reduction below normal values after treatment. Children from Termez during admission to the in-patient facilities were zinc deficient with further reduction to the poor prognostic level. Children in Saraosie admitted to the in-patient with significant zinc deficiency that remained on poor prognostic level after treatment.

Conclusions

The study results may indicate the treatment of AD in children do not replenish the zinc to the appropriate level. Though some confounding factors may contribute the observed zinc disorders the results may indicate environmental factors, such as pollution by aluminum producing plant emission to contribute the difference in zinc concentration and should be considered for the correction and treatment of AD in children.

Table 1.The serum zinc concentration in children with acute diarrhea from different regions of Uzbekistan before and after treatment.

City	n	Zinc concentration, μmol/l (mean ± SD)	
		Before treatment	After treatment
Tashkent city (capital)	36	13.8±1.5	12.5±1.3
Termez city	40	9.1±0.08	7.47±0.01
Saraosie city	26	7.9±0.3	7.5±0.8

Keywords

Acute diarrhea; zinc; zinc deficiency

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