



INTRODUCTION

Environmental factors have a great influence on human health.

The important task of medical ecology is to examine the accumulation of the air harmful compounds in the human body's tissues and organs. Environmental pollution can be defined by physical and chemical methods and biological indicators: teeth, bones, hair, blood and nails. Determination of heavy metals and essential chemical elements in hair and dental hard tissues plays an important role in monitoring the impact of environmental pollution, and evaluating risk factors of the development of dental diseases.

OBJECTIVES

To study the influence of environmental pollution on the mineralization of dental hard tissues by using bio substrates: teeth and hair.

METHODS & MATERIAL

At the first stage epidemiological survey was conducted in polluted and less polluted areas of Tbilisi (Georgia). We studied 525 children aged 3 and 4 years. Caries prevalence and intensity was defined by the methodology of World Health Organization. At the second stage the chemical elements content was studied in hair and dental hard tissues of 24 children by X - ray fluorescent spectroscopy method. The examination was carried out after obtaining the informed consent from the parents.

RESULTS

The prevalence of dental caries in the polluted region was 46%, caries intensity - 1.92 (\pm 2.842). In the less polluted region prevalence was 37%, caries intensity - 1.47 (\pm 2.571). These data are statistically reliable ($p < 0.05$). It is noteworthy that dental caries prevalence increases with age.

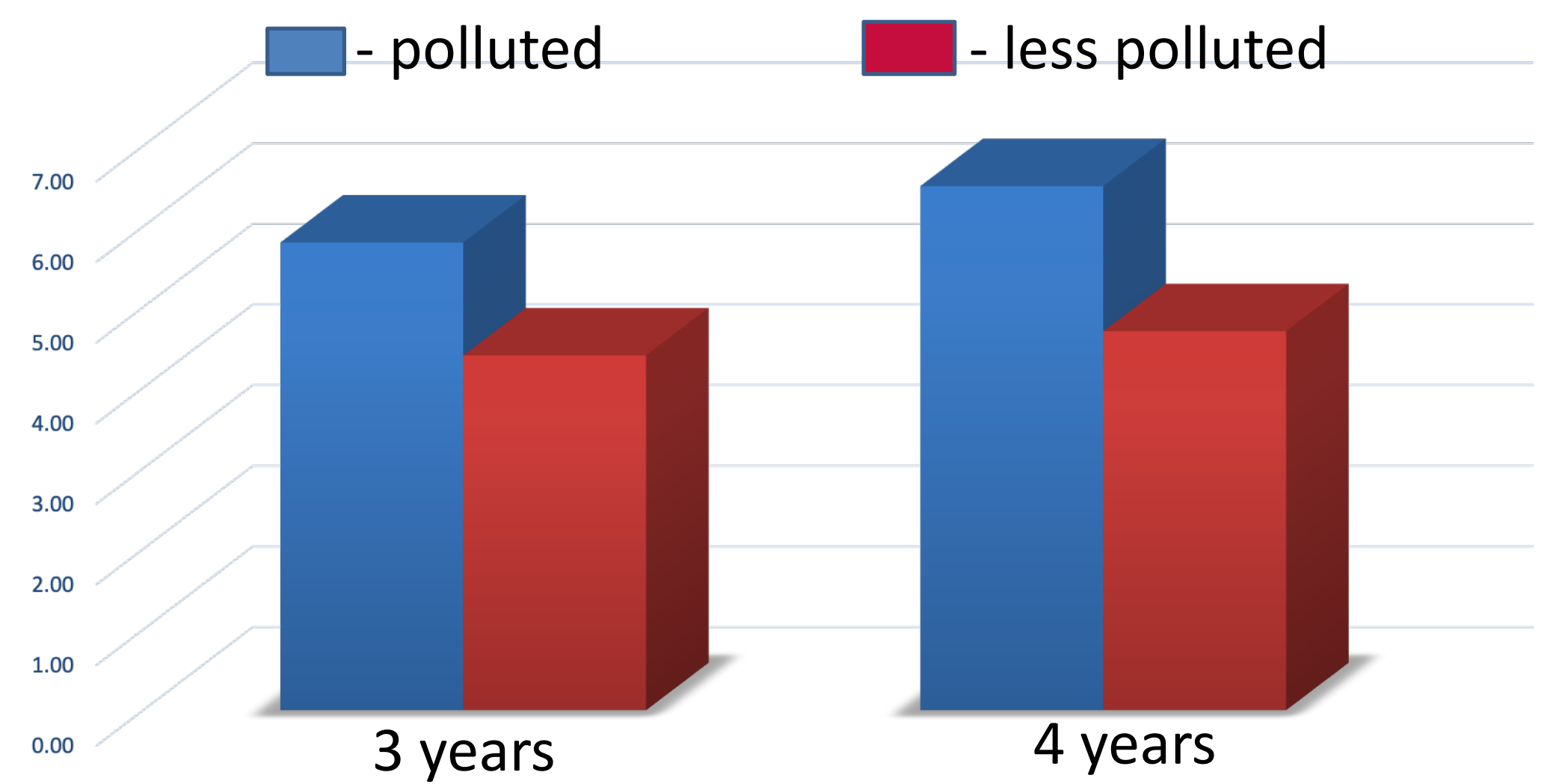
The study of hair and dental hard tissues showed that the toxic elements (Pb, Hg, Sn, Ti) content in these tissues was higher in environmentally unfavorable than in favorable conditions.

In hair sample, particularly significant difference according to the environmental conditions were observed in Lead (Pb -2.66; 1.55), Arsenic (As - 0.168; 0.07) and Tin (Sn - 0.45; 0.15) case, and mercury (Hg - 0.73; 0.72) content was almost the same for both ecological environment.

From the toxic elements, the content of Pb (7.74; 4.95) and Hg (0.819; 0.578) in dental hard tissues were much more in environmentally polluted areas than in less polluted.

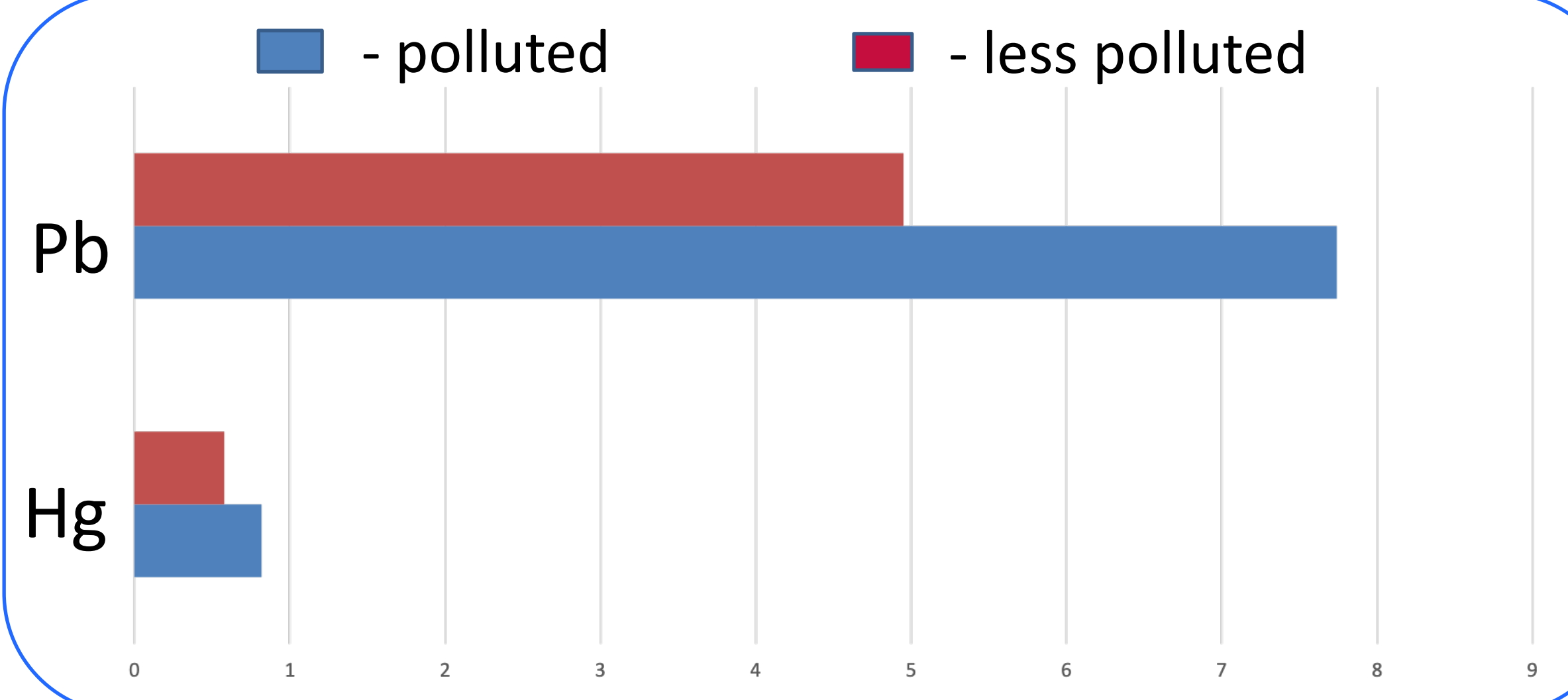
According to the study of dental hard tissues (enamel, dentin), particularly significant ($p < 0,05$) results were obtained with the essential elements - Zinc (Zn - 215 ± 111), Strontium (Sr - 103.5 ± 81.5). In particular, both elements' content was significantly elevated in the teeth samples taken from children from polluted areas. This suggests that Zinc and Strontium are important and necessary for the human body within normal range, but their extra content have negative impact on health.

Intensity of dental caries according to the age and environmental conditions.

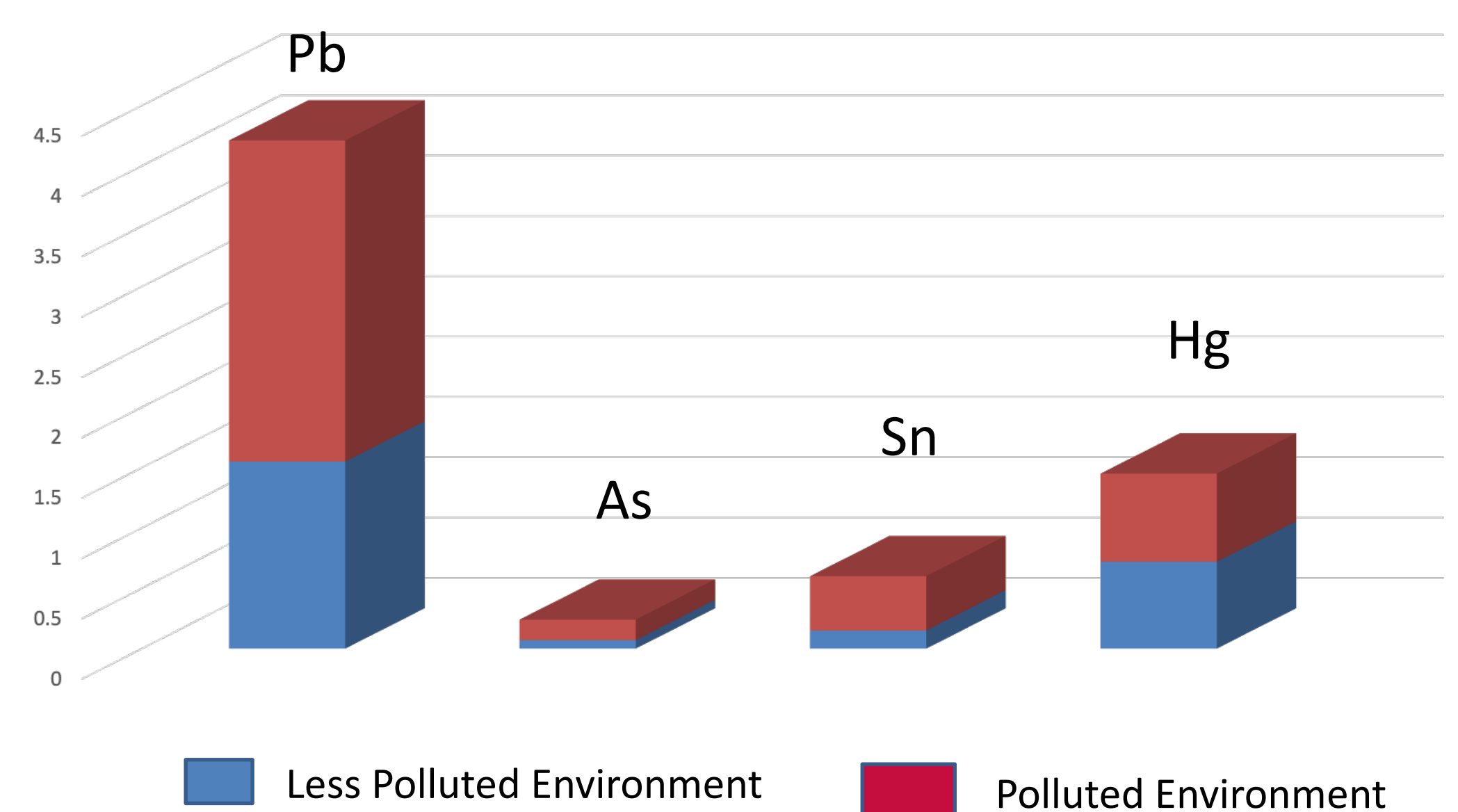


Chemical elements in dental hard tissues according to the environmental conditions

Elements	Polluted	Less polluted	p
Pb	7.74 \pm 1.765	4.95 \pm 2.302	< 0.05
Hg	0.819 \pm 0.423	0.578 \pm 0.253	> 0.05
Rb	0.315 \pm 0.179	0.380 \pm 0.293	> 0.05
Ca	250078 \pm 33073	260593 \pm 33899	> 0.05
Zn	215 \pm 129	111 \pm 33	< 0.05
Ni	1.04 \pm 0.72	1.21 \pm 1.50	> 0.05
Mn	11.29 \pm 767	9.59 \pm 5.57	> 0.05
Fe	104.78 \pm 29.4	93.84 \pm 49.5	> 0.05
Sr	103.5 \pm 35.7	81.5 \pm 25.3	< 0.05



Toxic Elements Content in Hair According to Environmental Conditions



CONCLUSION

Environmental conditions have a significant impact on general health as well as on dental status. Hair and dental tissues can be used as indicators of environmental pollution. Our survey showed that toxic elements content in bio substrates was higher and the level of essential elements was less in polluted than in less polluted areas in Tbilisi, Georgia.