

Iodine concentrations of spring water and serum TSH levels in 5-year old children resident in the estates of the Ratnapura district

V Abeysuriya, AR Wickremasinghe, KPJ Perera, A Kasturiratne
Department of Public Health, Faculty of Medicine, University of Kelaniya
Department of Pediatrics, Faculty of Medicine, University of Kelaniya

ABSTRACT

Objective

To determine the Iodine concentrations in drinking water sources of estate population of the Ratnapura district and to determine the association between iodine levels of drinking water and Thyroid Stimulating Hormone (TSH) levels in children aged 5-years.

Method

A descriptive cross sectional study was carried out in three phases in 2 randomly selected estates in the Ratnapura district from September to November, 2009. In phase 1, 1683 households were surveyed to identify common drinking water sources in the selected estates. In phase 2, blood samples from 51 randomly selected children aged of 5-years from same estates were taken to assay TSH levels after obtaining informed written consent from parents. In phase 3, water samples from 23 identified sources (wells, rivers and springs) were obtained and were analysed for iodine (I) levels by the catalytic reduction method. Based on elevation from mean sea level, water sources were grouped, and mean TSH levels and water Iodine concentrations were correlated. Ethical clearance was obtained from the Ethics Committee of the Faculty of Medicine, University of Kelaniya.

Result

The main source of drinking water was water springs (83.7%), followed by pipe-borne water (14.6%), rivers (1.5%) and wells (0.2%). Spring water at low altitudes had significantly higher Iodine concentrations than those located at higher altitudes ($p=0.002$). The mean spring water Iodine concentrations according to altitude were as follows 36.005.66 g/dl at 100-200m ($n=2$), 16.256.52g/dl at 201-300m ($n=8$), 7.754.11g/dl at 301-400m ($n=4$) and 3.831.60g/dl above 401m ($n=6$). The mean iodine levels of spring water (12.810.63g/dl) were significantly lower compared to other water sources (130.0112.12g/dl) ($p=0.0001$). The mean TSH levels of children according to altitude were as follows 1.781.15IU/ml at 100-200m, 2.210.64IU/ml at 201-300m, 2.170.46IU/ml at 301-400m and 2.040.17IU/ml >401m. There was no association between TSH concentrations of children and iodine levels of spring water at different altitudes ($p=0.69$).

Conclusions

The majority in the estates consume spring water. The iodine concentration of spring water was significantly lower as compared to other water sources. Iodine levels of spring water were significantly higher at lower altitudes than at higher altitudes. There was no association between serum TSH levels in children aged 5-years and iodine levels of spring water at different altitudes.