

Lessons from screening research programs of radiation-induced thyroid cancer and other thyroid diseases in Belarus after the Chernobyl accident

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Abstract

One of the most serious and internationally recognized health consequences of the Chernobyl Nuclear Power Plant accident in 1986 was a dramatic increase in incidence of thyroid cancer among those who were less than 18 years at the time of the accident. This increase was largely related to the effects of radiation from iodine-131 (the highest mean thyroid dose of 320 mGy was in children from Gomel Oblast, Belarus) and young age at exposure, although increased thyroid screening activity, iodine deficiency, and genetic predisposition might have contributed as well. Based on regional Belarusian data, recently we reported that nitrate content in drinking water from usage of nitrogen fertilizers may be another modifier of radiation-related increase in thyroid cancer incidence.

Various thyroid screening programs conducted in 1990–2008 in Belarus demonstrated that the variability in prevalence of thyroid carcinoma among children was between 0.19%–0.62%. Screening of individuals irradiated *in utero* showed the highest prevalence of thyroid hypoplasia (up to 4–10%) in different regions of Belarus. Children exposed in the first trimester of gestation had a significantly smaller average thyroid volume, higher TSH level and frequency of latent hypothyroidism compared with those exposed in the third trimester.

Official statistical data of the Ministry of Health also suggest that after the Chernobyl accident the incidence of autoimmune thyroid disease and hypothyroidism in Belarus increased significantly in all age groups.

Belarusian data suggest not only an increased risk of thyroid carcinoma but also of autoimmune thyroid disease and hypothyroidism among individuals exposed to iodine-131 and of thyroid hypoplasia among exposed *in utero*.