HOSPITALIZATION PATTERNS OF IMMIGRANTS FROM THE CHERNOBYL AREA IN ISRAEL

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**Background**

More than 700,000 immigrants from the former Soviet Union (FSU) have arrived in Israel since 1989. Of them, more than 100,000 arrived from areas exposed to radiation from the Chernobyl accident. Among residents of the exposed areas in the FSU an increase in thyroid cancer but no increase in leukemias has been reported.

**Methods**

All hospitalizations of immigrants from the FSU in 7 general hospitals of the major Health Maintenance Organization (HMO) in Israel during the years 1990-1994 were studied. These hospitals serve the general population of the geographical areas in which they are located, regardless of their health insurance affiliation. Of all hospitalizations the following diagnoses were sought: acute leukemia, chronic leukemia, thyroid cancer, brain cancer, breast cancer, hypothyroidism, hyperthyroidism. Records were included if any of the abovementioned diagnoses was registered either as the main diagnosis or as an accompanying diagnosis, based on the ICD codes registered on the discharge letters. Cases with multiple hospitalizations with the same diagnosis were counted only once.

Three groups were compared:

1. Immigrants from areas in Belarus which were strongly affected by radiation from the Chernobyl accident (n=41,215).

2. Immigrants from the oblast of Kiev in Ukraine, considered to be mildly affected by radiation (n=34,035).

3. Immigrants from the non-radiation-affected cities of St. Petersburg and Moscow (n=41,215).
Hospitalization of New Immigrants from the FSU in Kupat Holim Hospitals, Israel, 1990-1994

1. Acute and Chronic Leukemia
   - Age-adjusted hospitalization rate/100,000
   - Moscow-St. Petersburg
   - Kiev
   - Exposed Belarus
   - Acute Leukemia
   - Chronic Leukemia

2. Radiation-related Carcinomas
   - Age-adjusted hospitalization rate/100,000
   - Moscow-St. Petersburg
   - Kiev
   - Exposed Belarus
   - Thyroid Cancer
   - Brain Cancer
   - Breast Cancer

3. Benign Thyroid Disorders
   - Age-adjusted hospitalization rate/100,000
   - Moscow-St. Petersburg
   - Kiev
   - Exposed Belarus
   - Hypothyroidism
   - Hyperthyroidism

n = number of cases
Adjusted to World Standard Population
Five-year age-adjusted hospitalization rates per 100,000 population and 95% confidence intervals were also calculated for each disease and each study group.

Results

During the period of investigation there were 66,913 hospitalizations of immigrants from the FSU. Of these, 410 were for the selected diagnoses in the relevant study groups.

a. Leukemias (figure 1)

The age-adjusted hospitalization rate from acute leukemia was higher for immigrants from Belarus; 16.7/100,000 (4.9-28.7) than for immigrants from Kiev, Moscow-St. Petersburg (4.8/100,000 and 4.9/100,000 correspondingly).

The age-adjusted hospitalization rate from chronic leukemia was also highest (19.6/100,000, C.I. 10.8-28.3) among the immigrants from the exposed areas in Belarus.

Radiation-related solid tumors (figure 2)

The differences in hospitalization rates of thyroid cancer, brain cancer and breast cancer were small and not significant. Thyroid cancer (14.7/100,000) and brain cancer (19.2/100,000) were more common in immigrants from Belarus. Breast cancer was similar in immigrant females from Kiev (196/100,000) and Belarus (192.8/100,000) and higher than in immigrants from Moscow-St. Petersburg.

Non Malignant thyroid disorders (figure 3)

Hypothyroidism was similarly diagnosed in immigrants from the three areas (26.8/100,000 in Moscow-St. Petersburg, 30.0/100,000 in Belarus, 30.5/100,000 in Kiev).

Hyperthyroidism, though, was much more common among immigrants from exposed areas in Belarus (25.8/100,000, C.I. 16.0-35.7) than for immigrants from Kiev (14.3/100,000, C.I. 4.1-24.5) and immigrants from Moscow-St. Petersburg (9.1/100,000, C.I. 7.5-10.7).
Conclusions

These data provide some support to a possible radiation effect on the occurrence of leukemias and hyperthyroidism among immigrants from the FSU to Israel.

The data-base employed in this study is unique in its non-selectiveness. It is further relatively protected from detection-bias as all diseases of the hospitalized patient were taken into account, and not only the main diagnosis. There is no reason to believe that the medical teams in Israeli hospitals employ a different diagnostic approach for patients from within and outside of the Chernobyl area.

The current database, though based on a large number of hospitalizations, has come-up with only a small number of end-point events. This is due to the relative rareness of events such as leukemia, thyroid and brain cancers. In spite of the small numbers, the differences between the various study populations are easily visible, and even reach significance for leukemia and hyperthyroidism. As results from Ukraine and Belarus on leukemias are generally negative, these findings are of interest and call for more in-depth study of the issue. Thyroid diseases leading to hyperthyroidism, such as autoimmune thyroiditid have been recently mentioned to be on the increase among the exposed populations. Our data lends support to this finding.