

ANTHROPOMETRICAL CHANGES OF BELARUSIAN PEOPLE AFTER THE EXPLOSION AT THE CHERNOBYL NUCLEAR POWER STATION

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Abstract

Anthropological research of Belarus conducted in 1992-1994 reveals following results. Physical evolution of children and teenagers have become worse in zone of radio-active pollution. It's marked general tendency to astenization of schoolchildren. Amplitude of sexual distinctions is greatly expressed. Quantity of contrasting somatotypes (big difference of body measurements between individuals) increases. These facts are evidence of ecological disaster and lead to breach of people hormone profile and tension of adaptation processes. Response of youngest girls (3-5 year old) to the increase of ^{137}Cs pollution is that great quantity of their anthropometrical parameters become lower (cranium, adipose tissue of forearm and stomach) or higher (length of legs and arms, cross and longitudinal diameter of head, measure round the shoulders, hip and shin, adipose tissue of shin). For boys of the same age group parameters of cranium, adipose tissue of forearm, back and stomach become lower and parameters of length of arms, longitudinal and cross diameter of head, measure round the shoulders and shin, adipose tissue of shin become higher. Pollution of the territory by ^{137}Cs up to level 5 Ku/km^2 not change weight and length of children body.

Introduction

Belarus was endangered by the strong radiation influence as a result of Chernobyl disaster. Approximately 70 % of whole nuclear fallout settled on the territory of republic. About 23 % of the territory (3 668 places) was polluted by fallout with unit-mass activity of ^{137}Cs over then 37 kBk/km^2 . At present 1 485 200 persons live on the territory where level of ^{137}Cs pollution equals 37-185 kBk/km^2 . Residence-places of 355 700 persons are situated on the territory with even higher density of radiational pollution (185-1480 kBk/m^2). 110 000 liquidators of crash aftereffects and 131 200 persons migrated from the most polluted areas also live in Belarus. Thus almost fifth of belarusian population have suffered from explosion at the Chernobyl nuclear power station. As it should be Chernobyl crash resulted in abrupt worsening of ecological situation and conditions of life in region (1). It is to be supposed that the number of oncologic cases and diseases of thyroid gland has increased on account of radiation factor (2). For instance in 1998 ratio of registered cases of thyroid-gland cancer equaled 319,1 to each 100 000 persons in republic. Since 1991 number of congenital mutation cases has been also considerable increasing.

When dose of thyroid-gland irradiation was more then 200 cGr the state of children health underwent the most unfavourable changes. Reduction of thyroid-gland functional activity impede appearing of first ossifying centres, growing of long tubular bones and growing in height, sexual and mental developing. This process is accompanied by deformation in forming of bony system, retaining of retardate proportions (wide and short tubular bones), lagging in evolution of facial skeleton (flat and wide bridge of the nose, short and snub nose, wide distance between eye-sockets), tardy teething (milk and permanent). Hyperfunctioning of thyroid gland also depresses growing and development of bony system. Maximal lag in growing coincides with stages of intensive forming and developing of children's organs and systems (3-4 years old, 7-8 and 13-14 years old) (3). At present anthropometry and pertaining to it methods allow to reveal unknown before symptoms which result from or accompany a disease. By these symptoms the existence and the nature of a disease may be diagnosed more precisely.

Methods

It were used standard anthropometrical tools i.e. spring-balance, anthropometric measuring instrument, pelvic measuring instrument, vernier caliper, measuring tape. Following essential parameters were necessary for measuring: weight and length of body; length of trunk; length of leg; measure

round the shoulders; measure round the pelvis; measure round the thorax; girth of hip; cross and longitudinal diameter of head; linear measure of head in circumference.

Results

Response of youngest girls (3-5 year old) to the increase of ^{137}Cs pollution is that great quantity of their anthropometric parameters become lower (cranium, adipose tissue of forearm and stomach) or higher (length of legs and arms, cross and longitudinal diameter of head, measure round the shoulders, hip and shin, adipose tissue of shin). For girls of the middle age-group such parameters as adipose tissue of forearm, back and stomach become lower; other parameters (cross and longitudinal diameter of head, measure round the thorax) become higher. Response of elder girls is that quantity of their parameters become lower (measure round the thorax and shoulders, adipose tissue of forearm and back) or higher (cross and longitudinal diameter of head, adipose tissue of shin) (4).

For boys of the youngest age-group (3-5 year old) parameters of cranium, adipose tissue of forearm, back and stomach become lower; parameters of length of arms, longitudinal and cross diameter of head, measure round the shoulders and shin, adipose tissue of shin become higher. Response of middle age-group boys to the increase of ^{137}Cs pollution is that their anthropometric parameters become lower (cranium, adipose tissue of forearm, back and stomach) or higher (longitudinal and cross diameter of head, measure round the thorax, adipose tissue of shin become higher). For boys of the elder age-group parameters of cranium, adipose tissue of forearm and back become lower; parameters of length of arms, longitudinal and cross diameter of head, adipose tissue of shin become higher. Pollution of the territory by ^{137}Cs up to level 5 Ku/km^2 not change weight and length of children body (4).

Discussion

Profound medical check-up reveals that adaptable resources of children's organism were weakened even 8 years after the Chernobyl crash. At that time orphological, cyto-chemical and electron-microscopic analysis still determine quantitative and qualitative changes in blood-cells and even cyto-genetic markers of radiation influence. Obtained data are the evidence of forming certain types of response in immune system of children. That was conditional upon both radiation situation in places of residing and age and sexual distinctions (5). According to official data not more than 10% of children can be considered as healthy. In accordance with information of belarusian "Children of Chernobyl" committee this statistical data is less (3-5 %).

Population of polluted regions is under the influence of various unfavourable factors. External and internal irradiation coupled with psychological factors and malnutrition have an effect upon population. That's why it is hard to ascertain definite pathogenesis of one or other revealing pathological deviant in state of children health. All this hampers realization of directed medical-preventive measures (6).

Conclusions

Summarizing all above-stated it can be made the conclusion that significant dynamics of anthropometric parameters is characterized for patients with pathology of thyroid gland. At the same time interpretation of mentioned changes is not easy because of age and sexual influence.

Acknowledgments

The author thanks Iryna L. Babicheva (The A.D. Saharov International State Ecological University, Faculty of radio-biology and ecological medicine) for her assistance and help.

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