“Radiation risk of individual multifactorial diseases in offspring of the atomic-bomb survivors: A clinical health study”


J Radiol Prot 2013 (March); 33(2):281–93 (Epub ahead of print)
(doi: 10.1088/0952-4746/33/2/281)

[Study findings]
In the first-generation (F1) offspring of A-bomb survivors, we found no evidence that paternal or maternal radiation exposure is associated with increased prevalence of each of six multifactorial diseases: hypertension, hypercholesterolemia, diabetes, angina pectoris, myocardial infarction, or stroke.

[Explanation]
In a clinical study of the offspring of A-bomb survivors conducted at the Radiation Effects Research Foundation (RERF), health examinations of about 12,000 offspring of A-bomb survivors were conducted from 2002 to 2006 in order to examine whether there was a relationship between parental radiation exposure and prevalence of adult-onset multifactorial diseases. In the previous report (2008) from the study, F1 offspring of survivors who had contracted one or more of the six multifactorial diseases (hypertension, hypercholesterolemia, diabetes, angina pectoris, myocardial infarction, stroke) were classified as having multifactorial disease. As a result of analysis, no evidence was found to indicate that parental radiation exposure was associated with an increased risk of multifactorial disease in the offspring.

In this most recent analysis, Dr. Yoshimi Tatsukawa, associate senior research scientist (Department of Clinical Studies, Hiroshima Laboratory), and other researchers at RERF examined whether or not parental radiation exposure was related to an increased risk in incidence of each of the six multifactorial diseases in the F1 offspring, with the results being published in the Journal of Radiological Protection.

1. Purpose of the study
The purpose of this analysis was to examine whether parental radiation exposure was associated with an increased prevalence of each of the six multifactorial diseases (hypertension, hypercholesterolemia, diabetes, angina pectoris, myocardial infarction, stroke). This study made possible the assessment of radiation risks even when parental radiation exposure had affected only one or a few of the six diseases.

2. Study methods
Relationship between paternal or maternal doses as well as the sum of their doses
(gonadal doses) and each of the multifactorial diseases was examined in 11,951 F₁ offspring of A-bomb survivors in Hiroshima and Nagasaki (5,702 males and 6,249 females) aged 19-60 years who had participated in the F₁ clinical study health examinations from 2002 to 2006.

3. Results of the study

A significant positive relationship was not observed in the offspring between paternal or maternal doses and each of the multifactorial diseases. Moreover, in the analysis using total parental doses, no significant relationship was observed between parental radiation exposure and any of the multifactorial diseases targeted in the analysis.

We thus found no evidence that parental radiation exposure was associated with increased prevalence of each of the multifactorial diseases in the offspring. However, the average age of the offspring at the time of the study was young, about 49 years, and an increase in the incidence of such disease is expected as the participants continue to age. It was therefore considered that careful observation should be continued. In 2010, RERF therefore initiated a longitudinal clinical study of the F₁ offspring of A-bomb survivors based on health examinations conducted every four years to more accurately assess the effects of parental radiation exposure on disease development in the offspring based on disease incidence.

The Radiation Effects Research Foundation has studied A-bomb survivors in Hiroshima and Nagasaki for more than 60 years. RERF’s research achievements are considered the principal scientific basis for radiation risk assessment by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and for recommendations regarding radiation protection standards by the International Commission on Radiological Protection (ICRP).

Journal of Radiological Protection, which is the official journal of the Society for Radiological Protection, publishes papers on all aspects of protection from radiation (ionizing and non-ionizing radiation). The publication’s scope is wide-ranging, including not only radiation dosimetry but also epidemiology, biological effects, and risk and environmental impact assessments. (Impact factor in 2011: 1.388)