



1.10 MORTALITY OF ATOMIC BOMB SURVIVORS IN NAGASAKI

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ABSTRACT

We analyzed the risk in 2,743 atomic bomb survivors by using a new dosimetry system. From the database, we selected 2,743 exposed persons and a total of three times 2,743 age-matched controls who were living far from the center of the A-bomb radiation in Nagasaki at the time of the explosion and who were still alive in 1971. The mortalities from all causes for male subjects exposed were slightly lower than, or almost equal to, those of unexposed persons. Death from cancer, however, increased in both sexes after all levels of irradiation except in males exposed to 0.01-0.49 Gy. In males, the risk was showed significant reduction in death from all diseases other than cancer classified according to 0.31-0.40 Gy.

1. INTRODUCTION

In 1945, two atomic bombs were dropped on Hiroshima and Nagasaki for the first time in human history. Since 1945, many studies^{1,2,3)} have been performed on the effects of the atomic bombing, for example, the physical damage, estimation of radiation dose and medical studies of the effects of the atomic bomb survivors and so on.

In 1972, the Scientific Data Center for the Atomic Bomb Disaster (renamed as the Division of Scientific Data Registry, Atomic Bomb Disease Institute in 1997) was founded in Nagasaki University to analyze the radiation effects on atomic bomb survivors. Information about A-bomb survivors are generated in many organizations. We have collected information from the City Office, Health Management center and other organizations. We have constructed an A-bomb survivor's Database in 1968⁴⁾, and we have collected medical data of survivors into the database there after.

2. METHODOLOGY

Atomic bomb survivors are the persons who have been issued the Atomic Bomb Health Handbook from Nagasaki City Government. There were 83,050 persons registered

as atomic bomb survivors living in Nagasaki as of 1968. The Health Management Center of Nagasaki City offers a free health examination to atomic bomb survivors twice a year. Since 1968, data of about two and half million health examination items have been stored in a database of a computer in Atomic Bomb Disease Institute in Nagasaki University.

We analyzed the risk in 2,743 atomic bomb survivors by using a new dosimetry system. From the database, we selected 2,743 exposed persons and a total of three times 2,743 age-matched controls who were living far from the center of the A-bomb radiation in Nagasaki at the time of the explosion and who were still alive in 1971. Number of subjects show in Table 1.

3. CONCLUSION

In our first analysis, we did was to compare the death rate between A-bomb survivors and controls. The figure 1 shows the mortality from all causes. The abscissa is age, and the ordinate is the death rate per one hundred thousand persons. The solid lines are for atomic bomb survivors, the dotted lines are for the control group. The circular symbols are for males, the triangular symbols are for females. Above sixty years old, the mortality of the exposed group is actually lower than that of the control group. Strangely, this result was unexpected. We think that this was due to early detection of disease and the advice about health care in the periodical health examination. A-bomb survivors have two free health exams per year.

The figure 2 shows the risk of cancer. We have analyzed the risk of atomic bomb survivors. The number of exposed group with radiation dose above 0.006 Gy were two thousand seven hundred and forty three persons. The number of zero dose group are eight thousand two hundred twenty nine persons. The abscissa is radiation dose, and the ordinate is the risk. Unity of the risk means the mortality rate of unexposed people. The risk of cancer increased with increasing dose for both sexes.

The figure 3 shows the risk of non-cancerous diseases. The risk of non-cancerous diseases did not increased with exposed radiation dose for male and female. However, in males exposed to 0.31 to 0.40 Gy, the risk was lower than unity.

REFERENCES

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Table 1. Number of subjects

Radiation Dose(Gy)	Male	Female	Total
0	3,159	5,070	8,229
0.006-0.30	540	922	1,462
0.31-0.40	111	139	250
0.41-0.50	69	126	195
0.51-1.00	126	214	340
1.01-5.99	207	289	496
Total	4,212	6,760	10,972

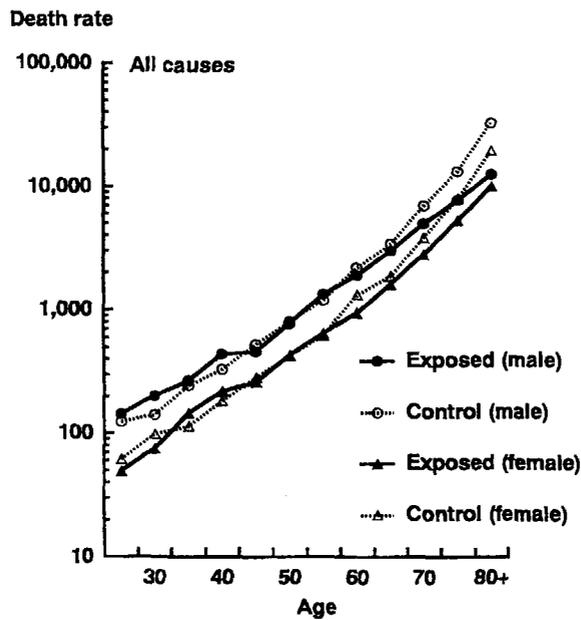


Fig. 1 Compare the mortality of exposed and control

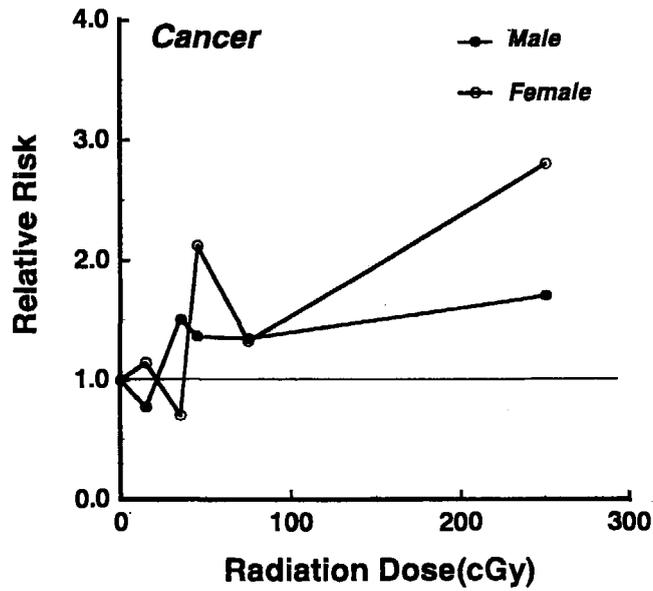


Fig.2 Relative Risk by radiation dose and sex (Cancer)

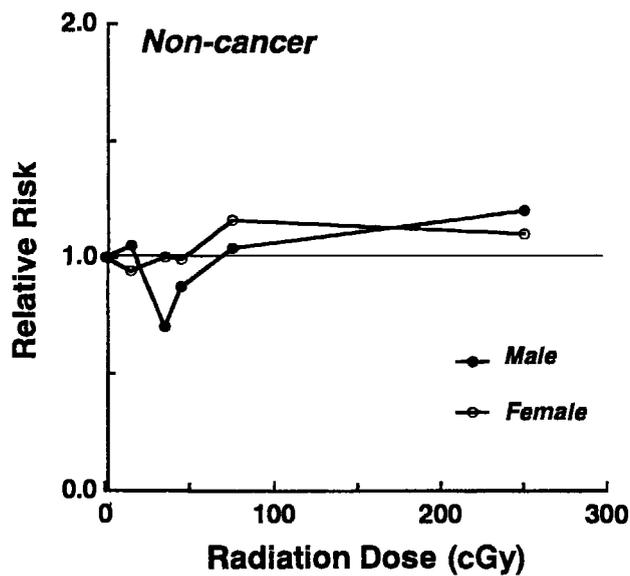


Fig.3 Relative Risk by radiation dose and sex (Non-Cancerous disease)