

Death from cancer among intellectually disabled persons in Japan

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ABSTRACT

BACKGROUND: It is important to know the causes of death of intellectually disabled (ID) persons, but there have been few reports about them in Japan.

MATERIALS AND METHODS: The numbers of deaths due to the diseases of the large classification of the ICD10 (Chapters 1-14) in 2005 in 5-year age categories were obtained from the vital statistics of Japan (excluding Chapters 15-22; i.e., external causes, etc.). The numbers of persons in 2005 in 5-year age categories were obtained from the census of Japan. Based on these data, the general mortality rates of the diseases were calculated. The numbers of ID persons in 5- and 10- year age categories in 2005 were obtained from the report of the Ministry of Health, Labor and Welfare of the Japanese

Government. Multiplying the general mortality rates by the numbers of ID persons, and summing these products, the expected number of each of the diseases in the ID population was obtained. The expected percentage of each of the diseases in the ID population was calculated and compared with the data previously reported by Souma *et al* on 72 ID persons who died in a facility for ID persons from 2001 to 2010 on an age-adjusted basis.

RESULTS: (1) In 2005 in Japan, the percentage of those who were 65 years of age or older (seniors) in the general population was 20.1%. In contrast, the total number of ID persons was 406,800, and that of seniors was 15,300 (only 3.8%). (2) Since the expected percentage of deaths due to cancer in the ID population was 37.8%, the expected number in the 72 ID persons was 27.25. However, the reported number was 10. The difference between these 2 numbers (27.25 vs 10) was significant ($p < 0.01$, chi-square test). Since the expected percentage of diseases of the respiratory system in the ID population was 14.3%, its expected number in the 72 ID persons was 10.3. However, the reported number was 31. The difference between these two numbers (10.3 vs 31) was also significant ($p < 0.01$).

CONCLUSIONS: The percentage of deaths due to cancer among ID persons was significantly low, and that of respiratory system diseases was significantly high, which was similar to findings in western countries. It is possible that some ID persons also have physical disabilities that make the risk of aspiration pneumonia higher, lead to premature death and, as a result, may make the percentage of cancer deaths relatively low.

Key words: Cancer; Intellectually disabled person; Japan; Mortality

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INTRODUCTION

Persons with some syndromes that are accompanied by mental retardation tend to develop neoplasms. For example, patients with trisomy 21 tend to develop leukemia. However, it is rare that they

have neuroblastoma^[1].

There are many intellectually disabled (ID) persons without definite chromosomal abnormalities. It is possible that such persons tend to or tend not to have several sorts of diseases. Therefore, it is important to know the causes of death of ID persons, but there have been only a few reports about them in Japan. In addition, there are no official data concerning the causes of death of ID persons in this country. In the present report, their mortality rates for various diseases are compared with those of the general population on an age-adjusted basis.

MATERIALS AND METHODS

The article by Souma *et al*^[2] is virtually the only report that describes causes of death of ID persons in Japan. In the present article, the observed numbers of deaths depend on this article. The numbers of ID persons in 5- and 10-year age categories in 2005 were obtained from a report of the Ministry of Health, Labor and Welfare of the Japanese Government.

The numbers of deaths due to the diseases of the large classification of ICD10 (Chapters from 1 to 14) in 2005 in 5-year age categories were obtained from the vital statistics of Japan. Chapters 15 to 22 (external causes and so on) were excluded, since no patients who died of such causes were reported by Souma *et al*^[2], and at present in Japan external causes account for only 5% of the total deaths.

The numbers of general persons in 2005 in 5-year age categories were obtained from the census of Japan. Based on these data, general mortality rates of the diseases were calculated. The standardized mortality ratio (SMR) was not calculated since the present process of calculation was different from that for the SMR.

The chi-square test was used for statistical analysis.

Table 1 Mortality rates of cancer in the general population.

Age	General Population	No. of deaths from of cancer	General mortality rate (per 10,000)
0-4	5547395	175	0.3
5-9	5899562	152	0.3
10-14	5990607	132	0.2
15-19	6523659	199	0.3
20-29	15290822	794	0.5
30-39	18185198	2810	1.5
40-49	15618859	8477	5.4
50-59	18967677	34780	18.3
60-64	8526772	29881	35
65-	25654351	258454	100.7

Table 2 Expected numbers of deaths from cancer in the ID population.

Age	ID Population	General mortality rate	Expected No. of deaths
0-4	15600	0.3	0.5
5-9	39800	0.3	1
10-14	36300	0.2	0.8
15-19	46200	0.3	1.4
20-29	83600	0.5	4.3
30-39	85000	1.5	13.1
40-49	43800	5.4	23.8
50-59	31500	18.3	57.8
60-64	9700	35	34
65-	15300	100.7	154.1
total	406800		290.9

RESULTS

The percentage of those who were 65 years of age or older (seniors) in the ID population was 3.8% (15,300/406,800). Table 1 shows the general mortality rates for cancers by age categories. The mortality rate was calculated by dividing the number of deaths by the population.

Table 3 Expected numbers and percentages of deaths in the ID population.

ICD-10 codes	Expected No. of deaths	Expected % of deaths
Respiratory system (J00-J99)	109.9	14.3
Neoplasms (C00-D48)	290.9	37.8
Cardiovascular (I00-I52)	152	19.8
Cerebrovascular (I60-I69)	98.9	12.9
Genitourinary system (N00-N99)	18.2	2.4
Blood (D50-D89)	3.5	0.5
Digestive system (K00-K93)	37.6	4.9
Musculoskeletal system (M00-M99)	4	0.5
Skin (L00-L99)	0.7	0.1
Ear (H60-H95)	0	0
Eye (H00-H59)	0	0
Nervous system (G00-G99)	13.1	1.7
Mental (F00-F99)	4	0.5
Endocrine (E00-E90)	16.6	2.2
Infectious diseases (A00-B99)	19.3	2.5
Total		100

Table 4 Observed and expected numbers of deaths of the 72 ID persons reported by Souma *et al*.

ICD-10 codes	Observed No. of deaths	Expected No. of deaths	
Respiratory system (J00-J99)	31	10.3	***+
Neoplasms (C00-D48)	10	27.25	**-
Cardiovascular (I00-I52)	8	14.24	
Cerebrovascular (I60-I69)	7	9.26	
Genitourinary system (N00-N99)	5	1.71	***+
Blood (D50-D89)	5	0.33	***+
Digestive system (K00-K93)	4	3.52	
Others	2	5.4	
Total	72	72	

*** $p < 0.01$, Observed No. > Expected No. **- $p < 0.01$, Observed No. < Expected No.

Table 5 Advantages and disadvantages concerning cancer of ID persons residing in a facility.

Advantages
No smoking
No drinking
Good lifestyle
Good eating habits
No occupational exposure to harmful substances (bladder cancer)
No sexual contacts (cervical and oropharyngeal cancers)
Disadvantages
Low level of physical exercise
No babies (endometrial and breast cancers)
No breast feeding (endometrial and breast cancers)
Few occasions for screening for cancer (lung, gastric, colorectal, breast, and cervical cancers)

The expected number of cases for each of the diseases in the ID population was obtained by multiplying the general mortality rates by the ID population, and summing the products. For example, the expected number of deaths due to cancer in the ID population was calculated by multiplying the general mortality rate for cancer (neoplasms) by the ID population. Adding up the expected numbers for each of the age categories, the number 290.9 was obtained. This is the total expected number of deaths due to cancer in the ID population (Table 2).

Using the total expected number of deaths from each of the diseases, expected percentages of deaths for each of the diseases in the ID population were calculated. Table 3 shows the total expected number of deaths for each of the diseases, and their expected percentages in the ID population.

Souma *et al*^[2] reported the causes of death of 72 ID persons who died in a facility for such persons from 2001 to 2010. The expected percentage for each cause of death in the ID population was multiplied by 72 to calculate the expected number of deaths among the 72. For example, since the expected percentage of deaths due to cancer in the ID population was 37.8%, the expected number in the 72 ID cases was 27.25. Table 4 shows the reported numbers (observed numbers) of deaths of the 72 ID persons in the article of Souma *et al*^[2] and the expected numbers of deaths. That due to cancer was 27.25, but the reported number was 10. The difference between these 2 numbers was significant ($p < 0.01$). The expected number of deaths due to respiratory system diseases was 10.3, but the reported number was 31, which was also significantly different ($p < 0.01$). That is, the mortality due to cancer was significantly low, but that of respiratory system diseases was significantly high. The results for diseases of the genitourinary system and those of blood both showed large differences, but their observed numbers were only 5 for each. That is, due to their small numbers, these results lack statistical power.

DISCUSSION

In many cases, the diagnosis of cancer can be made correctly, even though ID persons might not be able to describe their symptoms exactly to the medical staff. With the objective symptoms of cancer, and current diagnostic methods (e.g., radiological and biochemical ones), most cancers can be diagnosed. Consequently, the low mortality due to cancer may be due to its low incidence.

Several articles have also reported that there are smaller numbers of deaths due to cancer in ID persons. O'Leary *et al*^[3] gathered 27 articles concerning the causes of death of ID persons (most of them from western countries), and reported that cancer was less common and respiratory and circulatory diseases were the main causes of death. According to the article by Tyrer and McGrother^[4], SMRs of malignant neoplasms were not significantly high, but those of respiratory and circulatory diseases were significantly high in ID adults in the UK. In Japan, after the Second World War, along with the change in lifestyle, the mortality due to cancer has been increasing and has been the top cause of death since 1981^[5]. There might be a racial predisposition; e.g., it seems that Japanese patients with trisomy 18 tend to develop hepatoblastoma more often than western ones^[6]. However, the present results showed that the causes of death of the ID persons in Japan were similar to those in western countries.

According to a report by the Commonwealth of Massachusetts^[7], among adults with ID who resided in their own homes, the leading cause of death was cancer. The causes of death in lightly-handicapped ID persons may be similar to those of the general population. On

the other hand, those reported by Souma *et al*^[2] lived in a facility. That is, many of them were severely handicapped persons. Thus, the distribution of causes of death may be different between slightly handicapped persons and those who are moderately or severely handicapped. What causes this difference?

The average age at death of the 72 cases in the report of Souma *et al*^[2] was 59.7 years. Two articles^[8,9] reported that premature death was common among ID persons. In 2005 in Japan, the percentage of seniors in the general population was 20.1%. In contrast, that among the ID population it was only 3.8%. This also suggests that a smaller number of ID persons develop cancer since, in general, it is older people who do. Though in the article of Souma *et al*^[2] there are no descriptions about whether their cases were physically handicapped, it is possible that some of them were both intellectually and physically handicapped. If ID persons have physical disabilities, it makes their risk of aspiration pneumonia, which can lead to premature death, higher and, as a result, may bring about a relatively low mortality due to cancer.

The peak age at death of many cancers was 80-84 years of age in 2015 in Japan. It is possible that ID persons could age more rapidly than the general population. If so, however, the ages when ID persons would have cancers might also be younger than in the general population, and their mortality from cancer would be similar, but this was not the case.

ID persons who reside in a facility have several advantages and disadvantages concerning cancer (Table 5). For example, having no sexual contact is advantageous with regard to cervical and oropharyngeal cancers^[10], since it means no contact with human papilloma virus. In Japan, fewer occasions for cancer screening are offered for such ID people than for the general population, which is a disadvantage. As a whole, however, it is a very big advantage that they have no occasions to smoke or to drink.

The possibility still remains that they have predisposition to develop cancer less frequently. However, judging only from the present data, it is impossible to confirm or deny this hypothesis. To do so, detailed individual data are necessary, and the authorities should collect data concerning the causes of death of ID persons.

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