
Population-Based Database of Multiples in Childhood of Ishikawa Prefecture, Japan

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A new type of population-based database of multiples in childhood at the prefecture level was initiated in 2004 in Ishikawa Prefecture, Japan. We conducted an exhaustive search for demographic information concerning families with multiples, family support provided by governmental and medical institutions by mailed questionnaire, and at the same time tried to organize a human network to support such families. This registry aims not only to aid research on human genetics and maternal and child health, but also to contribute to the development of welfare programs for families with multiples.

The rate of multiple births has been increasing in Japan, as in other developed countries, since 1975 (Imaizumi & Nonaka, 1997). Currently more than 1% of all births are multiples. Therefore, there is an increasing need for appropriate information to be provided to parents and nursing staff on the growth and development of multiples, tips on childbearing, and social resources for families. However, little information is available, in part because the absence of a population-based registry of multiples makes it difficult to gather growth data on multiples, especially after birth (Ooki, 2006; Ooki & Asaka, 2005; Ooki & Yokoyama, 2004).

Studies on maternal and child health for families with multiples have a very short history. The majority of twin registries throughout the world seem to have been constructed primarily for genetic studies, as can be seen in the special issue of the *Twin Research* published in 2002, though several of these registries (Derom et al., 2002; Glinianaia et al., 2002; Strassberg et al., 2002) focus on maternal and child health for families with multiples. It appears to be very difficult to achieve a high participation rate from families with very young children in Japan, particularly if researchers perform only a genetic twin study with no feedback for the participants. The nurturing of multiples entails a higher burden physically, mentally and economically than that of singletons, and participants in twin studies surely expect appropriate information from twin researchers to facilitate the healthy growth of their twins. Offering information useful for the nurturing of multiples would be a

strong incentive for the parents to participate in such studies.

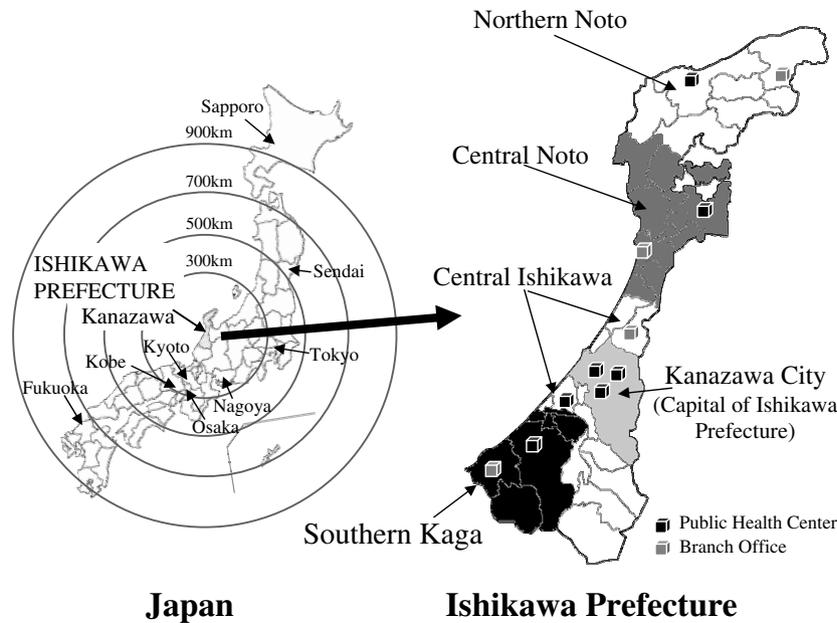
Given this background, the construction of a population-based database of multiples in childhood at the prefectural level began in 2004. The goals of the registry are to contribute to the development of welfare programs for families with multiples as well as to co-ordinate research useful for both human genetics and maternal and child health.

Strategies for the Collection of Data on Multiples in Japan

There are four main types of data included in studies on multiples in Japan. First, vital statistics can be obtained without access to personal information concerning individuals (Imaizumi & Nonaka, 1997; Kato, 2004; Minakami et al., 1999). Second, data from large hospitals have been used in the field of obstetrics, primarily for the purpose of managing high-risk pregnancies. The collection of obstetric data on multiples is relatively easy with the trade-off of selection bias in favor of high-risk infants. Third, there is a volunteer-based database of multiples, which includes, for example, data from mothers belonging to associations for parents of multiples; it covers the gap between vital statistics and hospital data (Ooki & Asaka, 2005). It contains more detailed information on the condition of multiples after birth; both vital statistics and hospital data have difficulty addressing this. Fourth, the Basic Resident Registration of municipalities in Japan, which is open to public reading, can be used. This registration reflects the whole population of each area, provides family-based information on name, sex and birth date, and serves as a possible source for complete recruitment for twin research. Nevertheless, this method has certain weaknesses. Some municipalities demand very high fees for using the registration. For this reason, considerable funding is necessary for research. Additionally, electronic data are not available, requiring arduous transcription by

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**Figure 1**

Position of Ishikawa Prefecture in Japan and its five districts.

hand. Moreover, some municipalities have recently begun restricting the availability of the registration data in keeping with new policies to ensure the protection of personal information.

These strategies each have their own strengths and limitations. Considering these, it was decided to construct a population-based registry of multiples.

Ishikawa Prefecture

Ishikawa Prefecture is located in the middle of the Hokuriku region of Honshu Island in Japan, as shown in Figure 1. The prefecture is long and narrow, from the south-west to the north-east. This area was governed by a very strong lord in the feudal age. This former feudalism may be reflected in attitudes toward patriarchy, sterility, child nurturing and multiple births in some districts. Kanazawa city, the prefectural capital, is now the center of the Hokuriku area, whereas Noto area is less-populated and accessibility is not good.

When this project was initiated in 2004, the total number of municipalities in this prefecture was 39 (nine cities, including Kanazawa city, 24 towns and six villages). The population is currently approximately 1,170,000, which is about 1% of the total Japanese population, and Kanazawa City has a population of approximately 450,000 (about 40%). Both the total population and birth rate of this prefecture have been gradually decreasing, while the percentage of people over 65 years of age has been increasing and is now about 20%. The birthrates of this prefecture over the past 10 years have been slightly lower than those of Japan as a whole.

Maternal and Child Health Administration in Japan

Japan consists of 47 prefectures, the basic unit of local government, and about 1800 municipalities (cities, towns and villages). National government policies for the health of mothers and children are planned and administered by the Maternal and Child Health Division of the Ministry of Health, Labor and Welfare. This division sets goals related to maternal and child health policies, performs research projects, eliminates regional differences in maternal and child health levels, and provides technical assistance to local public organizations and other associations (Maternal and Child Health in Japan 2004; Mothers' and Children's Health and Welfare Association, 2004).

Public health centers were operating in approximately 535 locations in 2006; additionally, the government offices of cities, towns and villages operate other municipal public health centers. These health centers administer independent policies together with the policies and administrative functions delegated or transferred by the Ministry of Health, Labor and Welfare. At present, most of the functions of Maternal and Child Health administration have been transferred from the prefectural level to the municipal level. Typically, a single prefecture has several public health centers, which serve several municipalities within their catchment area. Public health centers establish communication and coordination between municipalities with respect to maternal and child health projects in cities, towns and villages, give guidance and advice to municipalities on technical matters, and provide expert maternal and child health services. Each public health

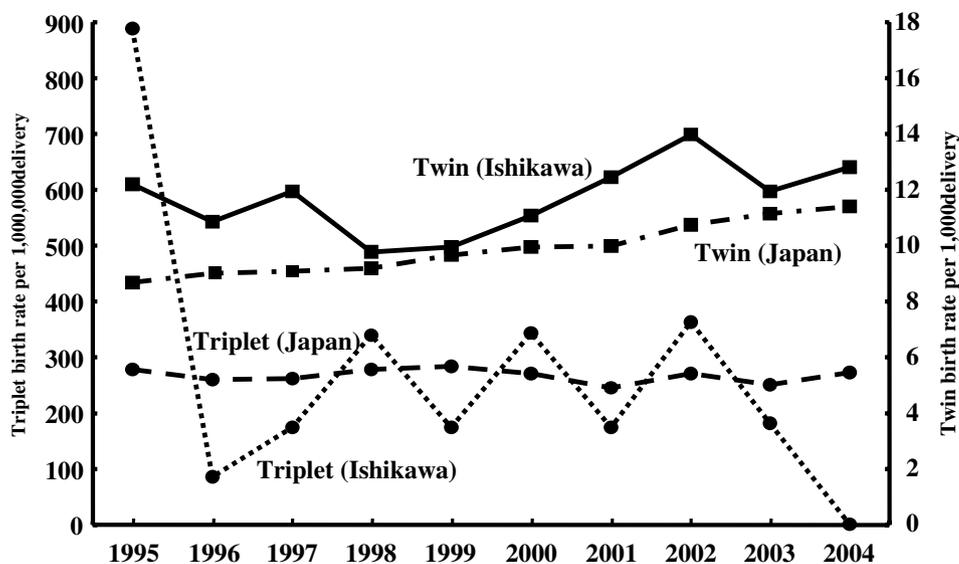


Figure 2
 Secular trends of multiple birth rate of Ishikawa Prefecture based on the Japanese vital statistics from the Ministry of Health, Labor and Welfare.

center may also have a local public health center, the branch office, if necessary. In other cases, the city defined by law as the ‘core city’ of the prefecture may also have its own public health center. As shown in Figure 1, Ishikawa Prefecture has four prefectural public health centers, each with a branch office, and Kanazawa City, the core city, has three public health centers.

Vital Statistics About the Multiple Birthrate in Ishikawa Prefecture

To obtain an initial outline of total multiple births, we analyzed secular trends of multiple births in Ishikawa Prefecture based on the Japanese vital statistics from the Ministry of Health, Labor and Welfare. The multiple birthrate was defined as the number of deliveries divided by the total number of births, including still-birth (Imaizumi & Nonaka, 1997).

Secular trends in the multiple birthrate of Ishikawa Prefecture between 1995 and 2004 based on the Japanese vital statistics are shown in Figure 2, which compares the statistics of Ishikawa Prefecture with those of Japan as a whole. The twin birthrate of this prefecture is consistently higher than that of Japan as a whole, appearing five times in the last 10 years among the 10 prefectures showing the highest twinning rates. The number of multiple births is between 116 and 159 deliveries each year after 1995. This number makes exhaustive identification of newborn multiples and a construction of the population-based registry possible.

Social Support by Governmental and Medical Institutions in Ishikawa Prefecture

Sources of support for families with multiples and information provided as support by governmental and

medical institutions were compiled exhaustively from a mailed questionnaire in June 2004. Recipients were all public health centers in the prefecture, a municipal public health center, and obstetric and pediatric hospitals and clinics in Ishikawa Prefecture. According to the Japanese Medical Service Law, a medical institution with 20 or more beds is defined as a hospital (a medical center), and others are defined as a clinic. The number of surveyed institutions totaled 417, consisting of 49 governmental and 368 medical institutions. The number of support associations available to the parents of multiples in this prefecture was ascertained through governmental and medical institutions as well as through personally obtained information, and their activity was investigated.

The results of the questionnaire on support for families with multiples are summarized in Table 1. The response rate was greater than 90% with respect to governmental institutions of health centers, and around 60 to 70% with respect to medical institutions, with the exception of a very low response rate concerning pediatric clinics. This response rate in itself seemed to reflect the interest in or relationship with the multiples shown by the institutions in question. The primary obstetric and pediatric hospital in this prefecture answered the questionnaire; however, these results must be interpreted carefully since the response rate of medical institutions varied and was much lower than that of governmental institutions. Moreover, the results are summarized irrespective of the catchment area, so do not necessarily accurately reflect the imbalance of the multiple birthrate according to the area. Certainly several municipalities have no or very few families with multiples. No deliveries

Table 1

Social Support Provided by Governmental and Medical Institutions for Families with Multiples in Ishikawa Prefecture

| | Governmental institution | | Medical institution | | | | |
|---|--------------------------|---------------------------|---|--------------------|------------------|--------------------|-----------------------|
| | City/town health center | Prefectural health center | NICU | Obstetric hospital | Obstetric clinic | Pediatric hospital | Pediatric clinic |
| Response rate | 92% (35/38) | 91% (10/11) | 65% (11/17) | 71% (20/28) | 58% (32/55) | 58% (25/43) | 34% (77/225) |
| Relationship with multiples | | | 100% (11/11) | 90% (18/20) | 25% (8/32) | 42% (10/24) | 34% (26/77) |
| Specialized family visit for families with multiples | 3% (1/35) | 33% (3/9) | | | | | |
| Specialized parenting class for families with multiples or expectant mothers of multiples | 3% (1/35) | 33% (3/9) | Specialized parenting class for families with multiples or expectant mothers of multiples | 12% (2/17) | 14% (1/7) | | |
| | | | Advice or support for the multiple birth delivery or child bearing | 73% (8/11) | 85% (17/20) | 27% (7/26) | 25% (6/24) 11% (8/76) |
| Advice or support for associations for mothers of multiples | 9% (3/35) | 11% (1/9) | Advice or support for associations for mothers of multiples | 75% (6/8) | 59% (10/17) | 57% (4/7) | 50% (3/6) 0% (0/8) |
| | | | Access to the governmental public health nurses regarding multiples | 63% (5/8) | 29% (5/17) | 57% (4/7) | 50% (3/6) 25% (2/8) |

Note: NICU = Neonatal intensive care unit.

of multiples are handled at local or small obstetric hospitals or clinics.

The three most important problem areas according to governmental and medical staff in supporting families with multiples were the following (combined results from both governmental and medical institutions; multiple answers permitted): the lack of knowledge on multiples among the professional supporters themselves (28% = 36/128), the lack of information on the families with multiples or on the multiple birth itself (20% = 26/128), and insufficient social resources available to families with multiples (20% = 25/128).

The number of multiple births in Ishikawa Prefecture, according to the five public health center catchment areas, are shown in Table 2. Multiple-birth deliveries were highly concentrated in the district at several higher-level medical institutions, that is, those that have a neonatal intensive care unit and deal with high-risk pregnancies, as expected. The medical institution handling approximately 75% of the multiple pregnancies of every year was specified, assuming that all pregnant women with a residential certificate in Ishikawa Prefecture use the medical institution of the prefecture.

There are 11 associations for parents of multiples, six in Kanazawa, three in Central Ishikawa, and two in Kaga, which vary in the size of their membership from about 10 to 200 families. The families of approximately 30% to 40% of multiples under 6 years of age are estimated to belong to some kind of association.

The present findings and outline of social support organizations available to families with multiples in Ishikawa Prefecture were important in the development

of a closely focused case report including a detailed interview about, among other topics, parenting classes specialized for families with multiples or expectant mothers of multiples, and in the construction of an effective human network.

Construction of the Human Network

We tried to organize a human network to support families with multiples alongside the demographic research and questionnaire survey. Our network was constructed with the help of the relationships between families with multiples, support groups for child rearing, governmental and medical institutions, and research institute such as the prefectural university. The Health and Welfare Bureau of Ishikawa Prefecture provided assistance in a positive way: several intensive meetings were held for the purpose of exchanging information between members of associations for the parents of multiples, the medical staff of large hospitals, public health nurses, midwives and twin researchers. Workshops and other events were also held periodically, about two or three times per year, in both the local and central districts of Ishikawa Prefecture. The workshop program included professional lectures on multiples and meetings where the parents of multiples could meet with each other and exchange experiences. We vigorously presented information to the mass media, including television stations, newspaper publishing companies, and local bulletins and newsletters. The local mass media was found to be quite effective in advertising our program. Moreover, past research results on multiples were rewritten so as to be easily understood, and were provided in a brochure presented to participants in the workshop, family support events, and so forth.

Table 2

Numbers of Multiple Births Reported by Medical Institutions According to the Five Districts of Ishikawa Prefecture

| District of the medical institution | 1999 | 2000 | 2001 | 2002 | 2003 | Reported number of multiple births |
|-------------------------------------|------|------|------|------|------|------------------------------------|
| Northern Noto | 1 | 4 | 4 | 1 | 3 | 13 |
| Central Noto | 5 | 12 | 6 | 11 | 6 | 40 |
| Kanazawa City | 51 | 47 | 71 | 74 | 63 | 306 |
| Central Ishikawa | 13 | 13 | 24 | 21 | 27 | 98 |
| Southern Kaga | 10 | 12 | 11 | 10 | 6 | 49 |
| Reported total | 80 | 88 | 116 | 117 | 105 | 506 |
| Vital statistics | 116 | 133 | 145 | 159 | 134 | 687 |
| Estimated % ^a | 69.0 | 66.2 | 80.0 | 73.6 | 78.4 | 73.7 |

Note: District of the medical institution does not necessarily mean the district of residence of families with multiples.

^aEstimated % was calculated by dividing reported total number of multiple births in each year by the total number of multiple births in each year reported by vital statistics.

Finally, the 'Ishikawa Network of Support for Families with Multiples' was founded in July, 2005. This network comprises a wide range of members, including families with multiples, maternal and child health authorities of the municipalities, and medical and research institutions. Its aims are to hold workshops, family support events and parenting classes specialized for families with multiples, to facilitate the exchange of information and discussion on maternal and child health policies, and to promote research on multiple births. Twin research includes studies in a wide range of fields that contribute to human genetics and maternal and child health.

The leaflet produced by this network is available in every public health center, municipal health center and obstetric and pediatric institution, as well as in other places where it would come to the attention of expectant mothers or parents of multiples. All expectant mothers who have submitted a notification of pregnancy receive a Maternal and Health Handbook, issued by the municipalities of Japan. If a woman receives more than one handbook, this indicates that she is an expectant mother of multiples. It is important to introduce the network to the families of multiples. Public health nurses, who introduce the network during their home visits, accomplish this effectively, especially in rural areas. In some cases, mothers with experience in nurturing multiples also visit maternity hospitals.

Perspective

The current work is the first attempt in Japan to construct a population-based database of multiples at the prefectural level, especially targeted to young children. Our strategies were appropriate for Japanese maternal and child health policies. The population of Ishikawa Prefecture is small compared to that of other major prefectures such as Tokyo, Kanagawa and Osaka. Recently, the number of multiple births in Ishikawa Prefecture has been approximately 100 to 150 every year, which makes an exhaustive study of multiples

possible. We focus particularly on research in the field of human genetics, the so-called twin study method, and maternal and child health. In addition, our project stresses the importance of the health and welfare of families with multiples. This strategy is welcomed by the many participants and other involved parties, and seems to be highly cost effective. The project has only just begun; we hope it will become fruitful, allowing our approach to be applied to other small prefectures in Japan.

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