

Current Status of Reproductive Function of Fertile Men and Young Men in Japan

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In 1992, Carlsen et al. reported a significant global decline in sperm quality over the last 50 years based on meta-analysis of data from a total of 14,947 men with or without proven fertility published in 61 papers between 1938 and 1990. In addition, several observations support that male reproductive function has been declining since World War II. However, other studies have not shown any declining trends. Carlsen's paper was quickly followed by numerous critical and editorial comments. Recently, Swan et al. reanalyzed a total of 101 studies published in 1943-1996 including 61 papers analyzed by Carlsen et al. They found significant declines in sperm density in the United States and Europe/Australia after statistically adjusted by abstinence time, age, percent of men with proven fertility, and specimen collection method, but no decline in sperm density in non-Western countries, for which data were very limited.

In order to evaluate the controversy about the trends of male reproductive health, Skakkebaek organized an international collaborative study entitled "The reproductive function of normal men from different regions of Europe: a study of partners of pregnant women", which started in 1996. We have been participating in this project since 1997. This study included questionnaires to the family (pregnant woman, her partner and his mother) and examinations for the partner (physical examination, semen analysis and endocrine examination). Semen analysis was performed according to the same protocol commonly used in the collaborative study under strict quality control by a central laboratory in the Copenhagen University Hospital.

A total of 359 fertile men with a mean age of 31.8 (25~40) in Kawasaki/Yokohama were eligible for the study. Mean values (min-max) for variables related to male reproductive function are as follows. Testicular volume was 22.6 (16~28) ml for right side and 23 (17~28) ml for left side. Abstinence time was 211.3 (48~2500) hrs. Semen volume, sperm density and sperm motility (Grade A+B according to WHO criteria) were 3.3 (0.4~10.0) ml, 120.9 (0.5~818) million/ml and 55.8 (8~87)%, respectively. Clinical varicocele was found in 28 cases (7.8%) only for the left testis.

We also investigated the reproductive function of 335 young men, university students, with a mean age of 20.0 (18~24) in Kawasaki from May 1999 to May 2000, according to a similar protocol that used in Denmark and Finland. Mean values for variables related to male reproductive function are as follows. Abstinence time was 74.3 (48~359) hrs. The average semen volume was 2.8 ml. Semen volume, sperm density and sperm were 2.8 (0.2~8.4) ml, 71.7 (0.1~447) million/ml and 58.4 (4~88)%, respectively. Clinical varicocele was found in 40 (11.9%) cases for the left and in 7 (2.1%) cases for the right.

The sperm density in fertile Japanese men was markedly high, but it was lower in young men. Subjects with a sperm density less than 20 million/ml, cut-off value for the normal sperm density according to the WHO criteria, were 7.5% in fertile men and 13.7% in young men.

These studies show the current status of reproductive function in both fertile men and young men with unknown fertility living in the Kawasaki/Yokohama area in Japan. This is the first large-scale epidemiological study for male reproductive function carried out in Japan based on standardized protocols of an international collaborative study. Since the evidence for secular changes in semen quality and other abnormalities in male reproductive health is inconclusive, multidisciplinary studies are needed to determine the possible effects of natural environmental and/or man-made factors. It is also important to verify the present results in comparison with the data on male reproductive function from well-defined population of men in different regional and geographical areas.