

Problems of Underweight in Young Females and Pregnant Women in Japan

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Hiroko KODAMA*¹

Abstract

The recent data in Japan show that 25.5% of young women are underweight, suggesting an increase of thin women in young age groups. This tendency of underweight already exists in childhood, and 18.1% of 6 to 14 year-old girls are underweight. Marked thinness causes anemia, reduced sex hormones, loss of bone density, hypotension, feelings of fatigue, and malaise. Failure to gain bone density in puberty could result in osteoporosis in advanced age in females. In addition, underweight in the pre-pregnancy period and failure to gain weight during pregnancy can lead to low-birth-weight infants. In 2006, low-birth-weight infants weighing less than 2,500 g accounted for about 9.6% of all newborns, which has nearly doubled compared with 5% in 1975. Undernutrition in the fetal period causes hypofunction of various organs and lays the foundation for future obesity and lifestyle-related diseases. The recent increase in underweight females is a result of their strong desire to be thin, which is attributed largely to the fact that society praise thinness. Influences from male preference, the mass media, and the fashion industry exert enormous pressure on young females. Therefore, to prevent being underweight, it is necessary for the entire society to promote the idea that “the charm of young females is healthy beauty.”

Key words Underweight, Young women, Pregnant women, Low-birth-weight infants

Current Status of Underweight in Young Females in Japan

In recent years, an increase in obesity, metabolic syndrome, and lifestyle-related diseases has become a social problem in Japan, and the Specific Health Examination and Specific Health Guidance program for these conditions have been implemented by the government since April 2008. However, while increased obesity is mainly attributable to adult men, increasing underweight women is becoming a serious problem (**Fig. 1**).¹ According to the results of Year 2007 National Health and Nutrition Survey, 25.2% of young females are underweight, with the body mass index (BMI: body weight (kg)/height² (m²)) being less than 18.5.¹

The increase in underweight females already

exists in childhood. The underweight status in children is not evaluated by means of BMI, but by the degree of obesity calculated from the standard body weight (reference body weight appropriate for actual height) and the actual body weight. Among girls aged 6 to 14 years, underweight (degree of obesity: < -20%) or underweight tendency (degree of obesity: -10 to -20%) is found in 18.1%.² The incidence of anorexia nervosa (diagnosed on the basis of criteria including a body weight of not more than 85% of the standard body weight, behavior geared to preventing any weight gain, a strong fear of obesity, and a distorted body image) is substantial, occurring in 1 out of 200 to 600 young females of junior high school to college years (13 to 24 years of age) in Japan.³

*1 Department of Pediatrics, Teikyo University School of Medicine, Tokyo, Japan (hkodama@med.teikyo-u.ac.jp).

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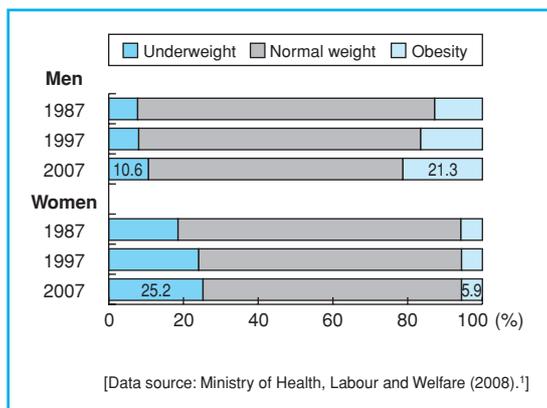


Fig. 1 Changes in proportions of obesity and underweight in Japan (among individuals aged 20 to 29 years)

Factors Influencing a Desire for Thinness in Young Females

A major factor for the increase in underweight young females is their strong desire for thinness. A questionnaire survey of young females revealed that their ideal body weight in terms of BMI was 18.59.⁴ In addition, more than 50% of young females are reported to be attempting to lose weight. In particular, more than 10% of low-weight females from puberty to the 30s are attempting to lose more weight. Thin women have a particularly strong desire to not gain any weight.⁵ The desire to be thin among girls usually begins during junior high school years (ages 12 to 15 years). However, in recent years even elementary school girls are exhibiting the desire for thinness, and the number is increasing.⁶

The desire for thinness is largely attributable to society's tendency to admire a thin figure. It is said that female celebrities whose body shapes are considered ideal by young females have a BMI of 17 to 18, or even 16.5, which represents an extremely thin figure.⁴ The issue of excessive thinness among girls in puberty and young females is also a significant concern in European countries and in North America. For fashion associations in Italy, France, UK, and USA, the death of a fashion model in 2006 due to anorexia nervosa served as a turning point, and they have addressed the extreme underweight of fashion models as a problem that could lead to anorexia nervosa in young people, attempting to reform

the awareness to emphasize healthy beauty. However, in Japan, studies of health problems resulting from underweight are limited, and such problems are rarely discussed in society.

Dietary Habits of Young Females

The desire of young females for thinness often creates unhealthy dietary habits. In Japan, an educational campaign to promote "early to bed, early to rise, make sure to have breakfast" has been widely waged. However, the number of people who skip breakfast is still rising, and about 25% of women in their 20s do not eat breakfast.¹ In addition, the mean energy intake is less than the estimated average (EAR) requirement in women at any age (Fig. 2a).⁷ Considering the fact that there are about 6% of obese women, the energy intake in underweight women seems to be markedly low. Furthermore, calcium and iron intake, which are important elements for any children and young females, are also markedly lower than adequate intake (AI) and recommended dietary allowance (RDA) in young females, respectively (Fig. 2b, c).⁷

Harmful Effects of Underweight in Young Females

Symptoms and abnormal laboratory findings

Women who have a strong desire to be thin are likely to rely excessively on unhealthy dietary habits and supplements, often feeling drowsy, fatigued, and malaise.⁴ Anorexia nervosa, which causes marked thinness, is associated with various symptoms and abnormal findings caused by undernutrition, and more than 90% of the patients are females. The major symptoms include hypotension, bradycardia, edema, dysgeusia, constipation, amenorrhea, insomnia, and loss of clear thinking, good judgment, and concentration, and major laboratory findings include anemia, leucopenia, increased transaminase, decreases in serum albumin, cholesterol, T3, and sex hormones, and decreased bone density. Underweight women who do not quite meet the diagnostic criteria of anorexia nervosa can also exhibit these symptoms and findings to a mild degree, which is a cause of concern.

Although there has been no report documenting the relationship between thinness and anemia, anemia is a serious problem in young

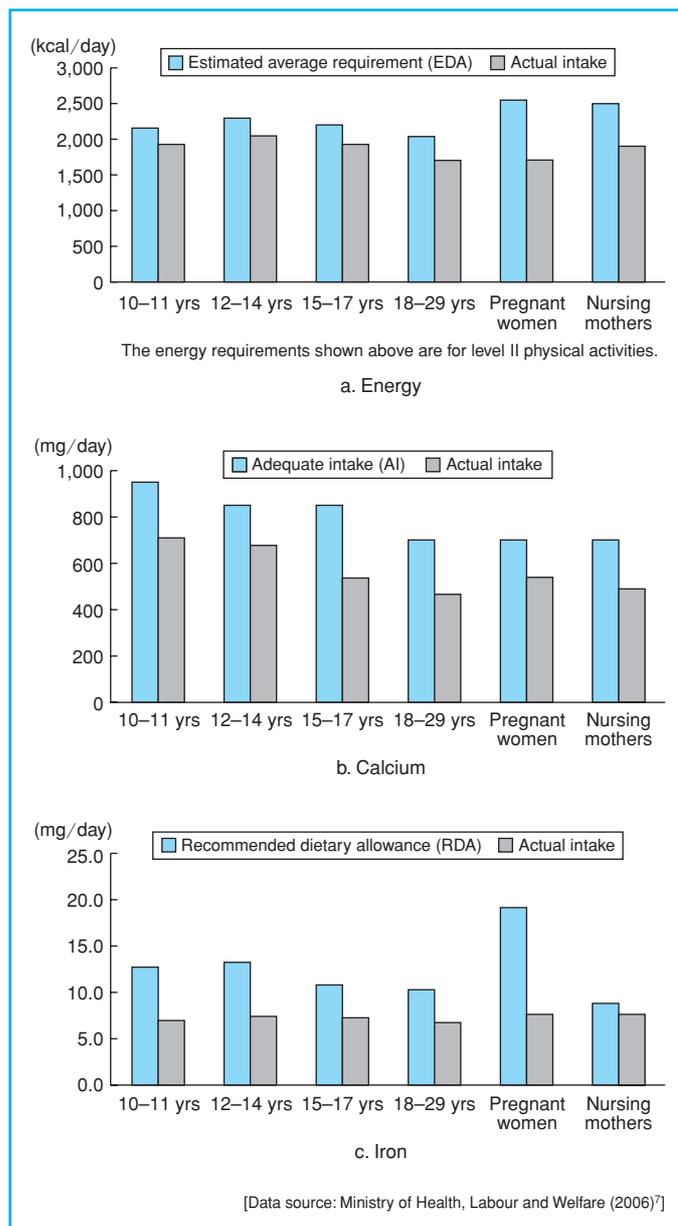


Fig. 2 Comparison between the estimated requirement or target amount and the actual amount of daily intake: (a) energy amount, (b) calcium intake, and (c) iron intake

women. In general, anemia in females is defined as a hemoglobin level of less than 12g/dL for non-pregnant females (elementary school age to adult) and 11.0g/dL for pregnant females. According to the survey conducted on children and college students (6 to 22 years of age, approximately) in Tokyo, females with the hemoglobin level of less than 12g/dL were shown to be 3.83% among 9 to 11 years of age, 8.27%

in ages 12 to 15, 12.03% in ages 15 to 18, and 11.13% in ages 18 to 22, showing an increasing trend with advance in age.⁸

Risk of delivering low-birth-weight infants

Underweight pregnant women have a high probability of delivering low-birth-weight infants.⁹ Disorders of low-birth-weight infants are described in the next section.

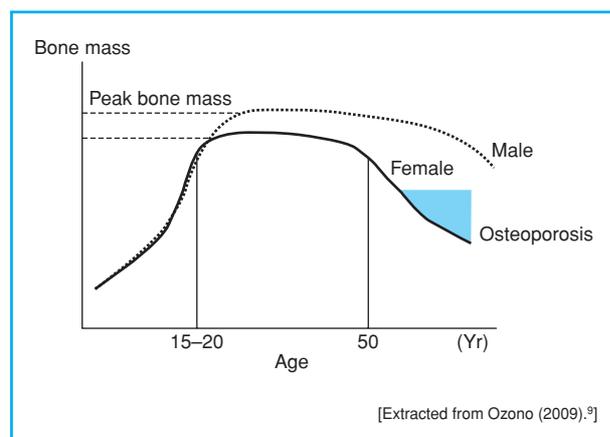


Fig. 3 Age-related changes in bone mass

Table 1 Recommended weight gain during pregnancy

Weight class (BMI)	Recommended gain for the whole pregnancy period	Recommended gain per week
Underweight (<18.5)	9–12kg	0.3–0.5kg
Normal weight (≥ 18.5 and <25.0)	7–12kg	0.3–0.5kg
Obesity (≥ 25.0)	Case by case	Case by case

Loss of bone mass

Figure 3 shows age-related changes in bone mass.¹⁰ Bone mass is enhanced in childhood,¹⁰ particularly in puberty. Bone mass in the body hardly increases after one reaches adulthood, and a female often loses bone mass after menopause and becomes susceptible to osteoporosis. Therefore, to prevent osteoporosis in elderly women, sufficient enhancement of bone mass in childhood is important. Pubertal and young females with insufficient nourishment and/or underweight are at higher risk of the loss of bone mass.

Harmful Effects of Malnutrition and Poor Weight Gain in Pregnant Women

Nutritional status in pregnant women

In recent years, the mean energy, calcium, and iron intakes in pregnant women and nursing mothers are markedly lower than the estimated requirement, target intake, or recommended intake in Japan (Fig. 2). In other words, many pregnant

women are presumably lacking in the intake of energy and important nutritional elements.

Harmful effects of poor weight gain in pregnant women

It is reported that poor weight gain before and during pregnancy causes poor nutritional status in the fetus, serving as a contributing factor for low birth weight and also inducing poor growth of the head circumference in the newborn. The incidence of low-birth-weight infants weighing less than 2,500 g has been increasing year after year from about 5% in 1975 to about 9.6% in 2006.¹¹ Namely, nearly 1 out of 10 newborns have low birth weight, which translates to about 100,000 low-birth-weight infants born annually. In addition, the mean birth weight has been declining since 1990, and the mean birth weight in 2006 was 3,050 g (vs. 3,230 g in 1980) for boys and 2,960 g (vs. 3,140 g in 1980) for girls. It is presumed that various factors including increased multiple pregnancy are involved in this decrease. However, the mean birth weight for single preg-

nancy has also been decreasing year by year,¹² and it has been pointed out that excessive restriction of weight gain among pregnant women is a reason.

Malnutrition in the fetal period causes developmental failure of various organs in the fetus, resulting in abnormalities such as insulin secretory failure, insulin resistance, glucocorticoid excess, leptin resistance, decreased renal function—all of which persist after birth as well. It is said that sufficient nutritional intake after birth in such children could lead to obesity, diabetes, lipid abnormalities, hypertension, and metabolic syndrome (, which are referred to as developmental origins of health and disease (DOHaD)).¹³

Measures against Underweight in Young Females and Pregnant Women

Dietary education starting from a younger age

Since the desire for thinness and underweight are increasing among elementary school girls, guidance of proper dietary habits is necessary from schoolchildren age. In addition, dietary education appropriate for each age group is

also necessary from low teens to college students. Particularly for young females, continued education concerning health problems due to thinness should be provided.

Guidance on proper dietary habits for pregnant and parturient women

In 2006, the Ministry of Health, Labour and Welfare of Japan formulated “the guidelines for dietary habits in pregnant and pre- and post-parturient women” and recommended to obtain appropriate nutrition during pregnancy while avoiding excessive nutrient restriction (**Table 1**).¹⁴ However, most people are not aware of such guideline, nor is it implemented widely. Further efforts are greatly needed.

Reversing a societal view that admires thin women

The desire for thinness among women is largely attributable to a societal view that admires thin women. The influences of young men, the mass media, and the fashion industry are enormous. It is desirable for the entire society to promote the idea that “feminine charm is healthy beauty.”

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