

# Health Education in Puberty

## — From the standpoint of an obstetrician-gynecologist

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### What Is Puberty?

Puberty in females refers to the period in which sexual capacities develop under the influence of female hormones produced in the ovaries. Obstetricians-gynecologists provide health education and other support to children so that every girl can experience sound growth of her body and mind and reach sexual maturity (ability of pregnancy and childbirth and self-reliant motherhood).

A girl entering puberty experiences her first menstruation, subsequent establishment of regular menstrual cycles, and the growth and maturation of genitalia (ovaries, uterus, breasts, vulva and vagina, etc.), accompanied by considerable psychological and behavioral changes (independence from her mother, awakening of interest in the opposite sex, and sexual behaviors). Menarche occurs in about 80% of girls by the 1st year (age 12–13) of junior high school and in about 90% of girls by the 3rd year (age 14–15). A series of events precedes the onset of menarche. The lowering of the sensitivity level of sex hormone in the brain (hypothalamus), combined with releasing of central inhibition resulting from increased leptin secretion and other changes, enhances and activates the secretion pulses of gonadotropin releasing hormone (GnRH). This in turn acts on the pituitary gland

to promote the secretion of gonadotropins (follicle stimulating hormone [FSH] and luteinizing hormone [LH]), which promotes the production and secretion of sex steroid hormones (estrogen [E] and progesterone [P]) from the ovaries. Finally, the feed back to the higher center completes the hypothalamus-pituitary-ovarian axis.

In a woman's lifetime, puberty is the only period in which the concentrations of sex steroid hormones from the ovaries increase with age. Within each menstrual cycle, the levels of E and its precursor steroids known as ovarian androgen (A) increase during the first half of the cycle before ovulation, and both decrease after ovulation. The level of P increases after ovulation and then declines with E unless pregnancy takes place. The stimuli of these sex hormones secreted from the ovaries in regular periodical cycles induce the development of sex functions and the gradual maturation of maternal functions.

### What Is the Expected Role of Obstetricians-Gynecologists in Health Education?

Obstetricians-gynecologists are engaged in community-based health education and related promotional activities, striving to ensure children achieve well-balanced development of their bodies and minds and reach sexual maturity

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**Table 1 Themes of health education talked by obstetricians-gynecologists**

Rank	Elementary school	Junior high school	High school
1	Secondary sex characteristics	Pregnancy	STDs
2	Sexuality in girls	STDs	Contraception
3	Menstruation	Contraception	Pregnancy
	⋮	⋮	⋮
18	Importance of life	How a new life is born	Importance of life, meaning of life
19	Puberty	Why there are men and women	Sex
20	Why parents chose to have a child	How men and women should prepare themselves	Giving birth or abortion

(Extracted from JAOG; 2003.<sup>5</sup>)

under the appropriate influence of sexual hormones. However, they are of the opinion that a discrepancy exists between what society needs and what children understand, and consider that the response to this situation is somewhat complicated.

What do we need in order to provide health education suitable for current realities, considering the deluge of sexual information through the Internet and other channels and the sensitivity of the minds of children? How can we respond to the diversified demands of parents, as well as the teaching staff providing health guidance and nursing care? The Japan Association of Obstetricians and Gynecologists (JAOG) seriously discusses these problems on various occasions such as the yearly Seminar on Teaching in Sex Education.

Themes of talks that has been requested recently from ob-gyn doctors visiting schools and the staff of schools are menstrual disorders and problems after sexual intercourse.

JAOG has asked its branches in the 47 prefectures of Japan to determine what themes are required in health education at present. The answers to this questionnaire survey are summarized in **Table 1**. The results strongly reflected the teachers' desire for talks on secondary sex characteristics, sexuality for girls, and menstruation for elementary school students (age 6–12) and on pregnancy, sexually transmitted diseases (STDs), and contraception for junior high school (age 12–15) and high school (age 15–18) students. While obstetricians-gynecologists have traditionally been emphasizing such themes as sexuality for boys and girls, the birth of a life, and the meaning of living, these themes seem to

**Table 2 Two major problems in puberty**

1. Menstrual disorders
1) Amenorrhea (lack of periods for 3 months or more)
2) Oligomenorrhea (cycles are too long)
3) Menstrual pain
2. Anxiety and concerns after sexual activities
1) Pregnancy (childbirth, abortion), contraception
2) STDs

have become somewhat less relevant.

Considering this situation, this article briefly discusses the present state of and response to the two major problems (**Table 2**) that need to be addressed in puberty health education. Both of these problems, if not addressed and promptly treated, may lead to serious impairment of sexual functions in the later life of students.

### Menstrual disorders

#### Amenorrhea

Menarche occurs in almost all girls by the age of about 15. If it does not occur by that time, the girl should be tested by an obstetrician-gynecologist for possible causes.

The most frequent type of amenorrhea is secondary amenorrhea, in which menstruation stops after the patient started to have normal cycles. The most disconcerting cause of this condition is weight loss, which accounts for 60–70% of all cases. Misguided by the popular notion that slimming means feminine beauty, an increasing number of girls are eating less nowadays. If the body weight drops to less than 80% of the ideal body weight and remains low for a long time,

leptin secretion decreases and the abnormalities of pulsatile GnRH secretion easily lead to amenorrhea. The severity of amenorrhea is classified into 1st degree, in which the condition is relatively mild and the basal secretion of E is observed, and 2nd degree, in which the secretion of E is lower than the basal level. If weight loss persists, amenorrhea develops into a severe condition, the body returns to an immature state, and bone density decreases. This condition frequently overlaps with a period of environmental changes and strong stresses associated with friend relationships, entrance examinations, club activities, etc. Unless an adult around the girl pays attention to her menstruation status, the consequences are likely to be serious. If amenorrhea is detected at an early stage and the body weight approaches the normal level, ovulation is restored in many cases.

Obstetricians-gynecologists have been addressing the cases of amenorrhea in puberty by teaching the importance of ovarian functions and performing hormone therapies early. These therapies work because the supplementary periodical administration of appropriate sex hormones prevents degenerative changes in the body and this affects favorably the reproductive functions in the future. According to a national survey concerning the use of hormone therapies for amenorrhea in puberty, the Kaufmann treatment (periodical administration of E and P preparations) is used in 80% of cases with 1st degree amenorrhea and in more than 90% of cases with 2nd degree amenorrhea. In addition to this treatment, clomiphene is used during 1 or 2 cycles a year in some cases, and the occurrence or absence of ovulation is inferred from basal temperature records. Despite these treatments, the recovery of biphasic basal temperature was not observed in more than 60% of severe cases. It is therefore important to make children understand the fact that if amenorrhea is left untreated for any length of time, complex treatment will be required in the future.

#### **Oligomenorrhea**

A girl with this condition is not amenorrheic, but has her periods only a few times a year. About 10% of such cases have polycystic ovary syndrome (PCOS). PCOS is a risk factor for the development of infertility and juvenile-onset cancer of the uterine body, and requires appropriate therapeutic intervention for the future.

Although the cause of PCOS has not been identified, some cases with oligomenorrhea developing during the middle period of puberty show PCOS-like lesions on ultrasonography and their blood concentrations of hormones tend to be slightly high for A and LH and low for E. As the menstrual cycles normalize, such lesions disappear from images and the blood levels of hormones return to normal. It is necessary that children complaining of oligomenorrhea and irregular menstruation are taught the importance of having regular menstrual cycles and given appropriate guidance.

#### **Menstrual pain**

Although menstrual pain is common (observed in about 90% of teenagers), severe pains can interfere with study and daily life, and some cases require more than simply giving an analgesic and following up with observation. Menstrual pain is usually functional pain resulting from immaturity of the uterus or the narrowing of the uterine cervix. The problem is that about 10% of women aged 10–29 are diagnosed as having endometriosis on detailed examinations. Endometriosis is a typical cause of organic menstrual pain. Unless endometriosis is detected and treated early, it frequently develops into a severe condition, resulting in intractable infertility in the future.

The JAOG survey of obstetric gynecological institutions in Japan (334 institutions) conducted over a period of 6 months in 2006 investigated the treatment of young patients with endometriosis. Of the 8,631 patients in total, 717 cases (8.3%) were teenagers with endometriosis. Contraceptive pills are often prescribed for adolescent menstrual pain with favorable results. (According to the JAOG survey, the therapeutic effect was satisfactory in 60% of patients with menstrual pain, menorrhagia improved in 60%, and improvement in menstrual cycles was noted in 80%.)

Recently, new hormone drugs with indications for dysmenorrhea (ethinylestradiol/norethisterone combination, ethinylestradiol/drospirenone combination, etc.) were approved for use under the national health insurance system in succession. This is good news because these include drugs that can be used for organic menstrual pain such as the pain from endometriosis and can be prescribed without adversely affecting the reproductive functions of puberty.

**Table 3 Annual changes in the number of births by the age of mothers**

	1995	2000	2005	2006	2007	2008
Total	1,187,064	1,190,547	1,062,530	1,092,674	1,089,818	1,091,156
Age 14 or less	37	43	42	41	39	38
Age 15–19	16,075	19,729	16,531	15,933	15,211	15,427

(Compiled from the Ministry of Health, Labour and Welfare; 2008.<sup>8)</sup>)**Table 4 Annual changes in the number of artificial abortions**

	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Total	319,831	301,673	289,127	276,352	256,672	242,326
Age less than 20	40,475	34,745	30,119	27,367	23,985	22,837
Age less than 15	483	456	308	340	345	347
Age 15	1,548	1,274	1,056	995	974	976
Age 16	4,795	3,875	3,277	3,071	2,811	2,771
Age 17	7,915	6,447	5,607	4,911	4,392	4,247
Age 18	11,087	9,747	8,236	7,191	6,245	6,071
Age 19	14,647	12,946	11,635	10,859	9,218	8,425

FY: Fiscal year

(Compiled from the Ministry of Health, Labour and Welfare; 2008.<sup>9)</sup>)

## Anxiety and concerns after sexual activities

### Pregnancy (childbirth, abortion) and contraception

Strong interest in the opposite sex begins to increase during puberty concurrently with the development of genitalia. As years pass, more and more individuals proceed from date to sexual activities (or similar behavior). The percentage of students who have experienced sexual activities is apparently increasing. According to a report, it is 1 in 4 students in the 1st year (age 15–16) of high school and about 1 in 2 in the 3rd year (age 17–18). The initiative in dating is taken mostly by the boy (man). In about 70% of high school students, the approach is made by the boy (man), while the girl makes the approach in only several percent of cases. Probably in a limited segment of students, there seem to be cases of forced or coerced sex. We therefore need to pay sufficient attention so that any potential victims of sexual violence may be detected. Today when much sexual information is available easily through the Internet and magazines, it is necessary for us to recognize the realities of adolescents and teach them how to avoid and prevent the anxiety and problems after sexual activities.

According to the announcement of the Japanese Ministry of Health, Labour and Welfare (MHLW) (**Tables 3 and 4**), the number of births by teenage girls is about 16,000 in a year, and this number has hardly changed during the past 14 years. This finding is remarkable, considering the national demographic trend toward fewer children, in which the total number of births in a year has steadily decreased to slightly above one million. A particularly alarming fact is that as many as 40 girls in the younger ages of puberty (age 14 or less) are giving birth before they reach sexual and maternal maturity (**Table 3**). This not only increases the risk associated with childbirth but also may be a factor leading to child neglect and child abuse in later years. On the other hand, while the number of artificial abortions at ages less than 20 is about 10% of all cases and is showing a modest decreasing tendency, the number for girls aged 15 or less has remained slightly above 1,300 cases a year, showing no sign of decrease during the past few years (**Table 4**). Furthermore, we need to face the fact that girls in this age group tend to repeat artificial abortions with careless abandon. A survey of 589 obstetric-gynecological institutions in Japan conducted

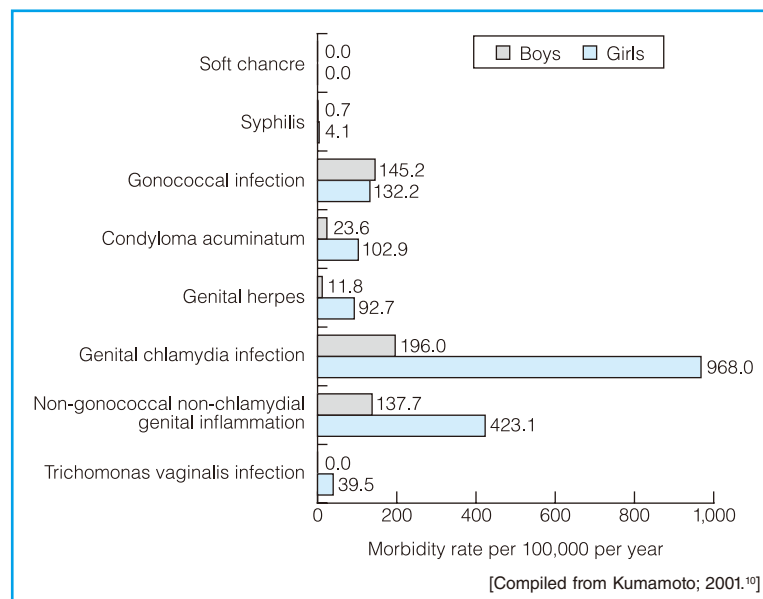


Fig. 1 Morbidity rate of STDs in teenagers (age 15–19)

by a scientific study team of the Japanese MHLW showed that there were 389 cases of artificial abortion in teenage girls in the single month of September 2006, and 63 (16.2%) of these cases were girls who had a past history of artificial abortion.

Obstetricians-gynecologists, as well as schools and communities, are expected to work with students so that they fully understand the fact that they run the risk of unwanted pregnancy unless contraception is used, and prevent them from experiencing unwanted pregnancy/child-birth and undergoing abortion with potential risks. In particular, we should disseminate correct knowledge about contraceptive pills, which are less commonly used in Japan than in Western countries. As students may worry about unwanted pregnancy after sexual behaviors (particularly in the case of sexual assault), they should be told that there is a relatively reliable way to avoid pregnancy that can be used as an emergency treatment (the use of levonorgestrel has recently been approved in Japan). On the one hand, children in puberty should be educated to avoid sexual activities until they reach a responsible age and appropriate conditions are met. In addition they should also be taught that both partners of sexual activity must be responsible and prepared, and be given knowledge so that they can

avoid anxiety and concern.

#### Sexually transmitted diseases (STDs)

A recent trend looming as a serious situation is the increase in STDs among teenagers (Fig. 1). The lowering of the age of patients is also recognized as a problem. The diseases showing remarkable increases among girls are genital chlamydia infection, in which subjective symptoms are scarce, and gonococcal infection, which is more likely to be asymptomatic in girls than in boys. These diseases in girls tend to be overlooked for a while after onset of infection and transmitted unnoticed to other individuals. Genital chlamydia infection, if not treated early, may expand from the uterus to the Fallopian tubes, causing salpingitis, obstruction of the tubes, and eventual infertility in later years. Furthermore, genital chlamydia infection makes the patient more susceptible to HIV infection, and this fact should be made known to children. Although less conspicuous than the above two diseases, genital herpes and condyloma acuminatum are also increasing gradually. Adolescents bear the important responsibility of reproducing and raising the next generation. We need to teach them so that they can fully understand and practice the JAOG's slogan, "Always use a condom when having sex!" for the purpose of preventing infections on their own accord.

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