

# ONSET OF PUBERTAL GROWTH IN A SAMPLE OF IRAQI FEMALE

## ADOLESCENTS<sup>+</sup>

\*Shatha hamed

### Abstract

The age of onset of puberty was estimated in a sample of Iraqi female adolescents depending upon the date of the first menstrual cycle [menarche], [luteinizing hormone] LH, [Follicle stimulating] FSH and [Estradiol hormone] E2 Level. 130 girls were enrolled in this research to determine their age of onset of puberty, they were apparently healthy adolescents. Iraqi female adolescents showed some what later onset of puberty with a mean age of  $14 \pm 0.07$ , while European data on the onset of puberty showed a gradual decrease in the age of menarche. Another important point had been noticed that there was an increased level of LH for some adolescent girls they had polycystic ovaries when examined.

### المستخلص

يعتمد تحديد البلوغ بظهور اول دوره شهريه لدى الاناث وتكون هذه العلامات بمجمعتها نتيجة زياده مستوى هرمون المودق لدى الاناث وقد تم ادخال 130 فتاة بالغه جميعهم بحاله طبيعيه وقد اظهرت نتائج البحث عن عمر البلوغ لدى نماذج من الفتيات  $14 \pm 0.07$  سنه حيث لوحظ وجود تاخر ملحوظ للبلوغ في العراق مقارنة مع الدول الاوربيه مع ظهور بعض الحالات لدى الاناث والتي يشتهر بانها حالات لمبايض متعدده الاكياس نتيجة زياده مستوى افرازى الهرمون اللوتيني .

### INTRODUCTION

Puberty is an important period of biological changes that our bodies go through. For girls it can begin between the age of nine to fourteen while for boys it will be

around the age of ten to seventeen, and the whole process can last only one to as long as six years [1]. When the children get nearer to puberty, the brain and pituitary gland release Gonadotropins hormones due to diminished sensitivity of the pituitary gland or hypothalamus or both to negative feedback effect of the sex steroid and as puberty approaches, nocturnal secretion of gonadal steroids rise gradually over several years before stabilizing into adult level when full sexual maturity is reached. So at the onset of puberty gonadotropins secretion increase, as it does in male, ovarian estrogen secretion rises and stimulate the development of female secondary sex characteristics and the onset of the menstruation [2].

The aim of this study is to shed a light on the onset of puberty in a sample of Iraqi female adolescents by clinical and hormonal evaluations.

### Timing for puberty

In most Asian and African countries menarche is later than in the western world. The timing of puberty in South America, Asia and Africa differs from the timing in

---

<sup>+</sup> Date received 5 / 5 / 2008 Date accepted 2 / 7 / 2009

\* Laboratory assistant Technical College Health and Medical

Western Europe or United State. The average of menarche age in United State is 12.5 years [3].

Data on the onset of puberty in Europe showed a gradual decrease in age of menarche in the last decade the influence of environmental factors on the timing of puberty in healthy Dutch children seems minimal, as no further decrease in the age of puberty [4].

Table [1] Reported age of menarche from different countries.

Economy classification	Country	Mean age of menarche
Low income	India	14.6
Low income	Srilanka	13.8
Low income	Ghana	14
Low income	China	13.7
Middle income	Bolivia	12.7
Middle income	Argentina	12.5
High income	Hong Kong	12.2
High income	USA	12.5
High income	Denmark	13.3

According to the world Bank Group

#### Factors affect timing of puberty

1. Genetic influence
2. Environmental condition
  - a. Socioeconomic state [SES]
  - b. Health care facilities
  - c. Nutrition

Although a genetic influence was assumed in children as a good indicator for timing of puberty, environmental condition should be viewed as the principal cause of earlier maturation [5]

The inverse correlation between improvements of SES, health facilities, and nutrition and the age of menarche in female or ejaculation age in male respectively was shown in several European countries [6].

Data on adolescent with very low [Body mass index] B.M.I and a menorrhoea show the importance of body composition in the onset and Progression of puberty.

Some studies from Dutch sample shows that taller and heavier adolescent had earlier menarche or ejaculation compared to smaller and thinner one, thus children who suffer from malnutrition may have delayed onset of Puberty [7].

In general it is a consistent finding within countries that adolescent from higher social classes has their age of onset earlier than those from lower classes [8].

### SUBJECTS AND METHODS

A sample of 130 girls, age, 13-15 years [all are apparently healthy] was randomly Selected from Baghdad city and they weren't complained of any disease and with no history of drug intake. Girls are subdivided into five age groups each with its own mean value  $\pm$  SD B.M.I, FSH, in addition to E<sub>2</sub>. The Data collection was taken by direct interview for this study.

#### Clinical staging

Routine evaluation of the participant was done through taking to assess the girls menarche time.

#### B.M.I

The height in Cm and the weight in Kg were measured and then the B.M.I was calculated for every adolescent from the following equation.

$$\text{B.M.I} = \text{body weight [kg]} / \text{body height [m}^2\text{]}$$

#### Setting

Hormones unit of clinical chemistry department of Teaching Laboratories of Medical City.

#### Methods

About five ml of venous blood was collected from each adolescent which was centrifuged at 4000 rpm for 10 minutes, so serum was separated which was then kept in a new sterile tube and stored at -20 C until time of hormones estimation which were determined at the teaching laboratories Center in the Medical City.

The blood sample was aspirated during early follicular phase of the cycle for LH, FSH, estimation and then another sample was aspirated at midluteal phase for E<sub>2</sub> estimation.

The main principle for hormonal assay used in our study is the one –step-sandwich method in which a complex of anti hormone antibodies which are bound to the tube wall, hormones in the sample and labeled anti-hormone antibodies is formed during this process, and at the end of the reaction the amount of the free tracer is removed by decantation and subsequent washing. The amount of the tracer specifically bound to the coated is measured with a gamma scintillation counter.

## RESULTS

The table illustrates the main parameters related to the girls; it included the mean values for adolescent girls for their age of onset of puberty 14±0.07 year

SD [Standard deviation]

Table [2] Hormone Profile, B.M.I and Onset of puberty in study sample

Girls			B.M.I Kg/m <sup>2</sup> mean [±SD]	E <sub>2</sub> [pg/ml] mean[±SD]	LH[mIU/ml] mean[±SD]	FSH[mIU/ml] mean[±SD]
Onset [years]	Number	Percent [%]				
13.0.	31	23.846	19.65[±1.02]	191.1[±16.1]	10.4[±1.5]	8[±1.21]
13.5	20	15.384	19.77[±1.09]	188.4[±14.3]	7.27[±1.7]	5.62[±1.23]
.14.0	36	27.692	18.72[±1.1]	172.6[±15.4]	6.95[±1.4]	5.77[±1.31]
14.5	18	13.946	17.8[±1.4]	168.8[±15.1]	6.7[±1.09]	5[±1.45]
15.0	25	19.23	16.49[±1.3]	148.[±14.22]	5.44[±1.62]	4.27[±0.09]
Mean age of onset's year			Mean BMI±SD	Mean E <sub>2</sub> ±SD	Mean E <sub>2</sub> ±SD	Mean FSH±SD
14.0±0.07			18.48[±1.22]	173.78[±25.5]	7.35[±1.64]	5.73[±1.25]

## DISCUSSION

1. Depending upon the first menstrual cycle for girls, beside clinical examination and hormonal estimation. Iraqi female adolescent in this study show somewhat a later onset of puberty with a mean age of 14±0.07, while European data showed a gradual decrease in the age of menarche. The reasons for these changes are not apparent but nutritional improvement, increasing obesity, physical inactivity could play a role far

and even could be more than the genetic factor that is to say environmental factor can change in some way or another the genetic factor in this condition [9].

2. Table [1] explained the relationship between the SES of the counties and the age of onset of their adolescent where high SES means decreasing the onset and vice versa.

3. The result in this study showed that more 60% of girls had menarche above 14 years this could explained the low SES that Iraqi population were used to live in especially in the last embargo

4. In general it is a consistent finding within countries that girl from higher social classes have their menarche earlier than their mates from low class [10], and that those adolescent with very low BMI and later menarche showed the importance of body composition in the onset and progression of the puberty..

5. Table [2] showed that the girls with an earlier age of onset have a good B.M.I and a higher hormonal level than those of later onset, the figures for BMI, LH, FSH, and  $E_2$  pointed to all groups will be decreasing in their values as far as we looking downward the table so that those with a later onset have the least BMI and hormonal values and this will concentrate the mind for the important of the study where a higher hormonal value and a good BMI means the early onset.

#### REFERENCES

1. Primus Mullis." Puberty car" *Hormone Research*, No.57 pp.145-152,2002 1
2. Maw C'mon k.M." Growth and Reproduction" *Hormone Research*, No.56 pp.1-16,2002
3. DMul w.Oostijk S.LS Drop" Early puberty in Adopted children" *Hormone Research* No.58,pp.17,2002
4. Theodoropoulou N." review of young people growth and development in developing countries " *Unicef.WHO sep.* p14. 1995
5. Ggorgopulrs N.M."Theodoropoulou Ingrowths and development", *Hormone Research* No.84,pp.4525,1999
6. Warrwn MP.Perloth NE." the effect of intense exercise on the female reproductive system" *Hormoneand spot*, No.170,2001 .
7. Roger Merle SL, Soot HJ "Variations in pattern of puberty changes in girls Am J" pp.332-334,1998.
8. Klein KO, Martha PM." longitudinal assessment of hormonal and physical alteration during normal puberty Am J" No.81,pp.320-337,1999.
9. Roemmich JN Clark Paragon AD." Alteration in growth and body composition during puberty AMJ Apple physiology" pp.927-935,1997 .
10. Viteri FE, Turn V.D and Guzman M.A ."Normal hematological values in Central American population J, Hematology" .