

# EVALUATION OF SERUM ANTI-MULLERIAN HORMONE AND ANDROSTENEDIONE LEVELS IN ADOLESCENTS GIRLS WITH MENSTRUAL IRREGULARITIES

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## Introduction

Irregular menstruation is the most common complaint among adolescent girls. There are many etiologic reasons for irregular menstruation. One of the causes of menstrual irregularity is Polycystic Ovary Syndrome (PCOS) in adolescent girls. In PCOS, menstrual irregularity is more commonly seen as oligomenorrhea or amenorrhea.

PCOS is seen during puberty and is characterized by hyperandrogenemia, hyperinsulinaemia and insulin resistance. Symptoms such as hyperinsulinemia, acne and menstrual irregularities in the PCOS are also seen in normal puberty. Therefore, the diagnosis of PCOS during adolescence is difficult. High levels of Anti-Mullerian Hormone (AMH) are considered to be a good indicator for the diagnosis of PCOS in adults. Our aim was to assess differences in serum AMH and androstenedione levels, and clinical characteristics between adolescent girls with and without oligomenorrhea.

## Subjects and methods

Sixty-eight adolescent girls with oligomenorrhea were included in the study. Sixty-four adolescent girls without menstrual irregularities also studied as a control group. All adolescent girls in this study were menarche at least 3 years ago. Oligomenorrhea was defined menstrual periods occurring at intervals of greater than 35 days, with only four to nine periods in a year. Anthropometric indices and the presence of hirsutism were assessed. Blood sample was drawn for serum AMH and androstenedione levels in the follicular phase. Transabdominal pelvic ultrasound (TPU) was performed to all participants.

## Results

Biochemical and anthropometric parameters of the patients and control group are shown in Table 1. Serum AMH and androstenedione levels in adolescent girls with oligomenorrhea were significantly higher compared with those without oligomenorrhea ( $p < 0.001$  and  $P = 0.022$ , respectively). Menarcheal age did not differ significantly between the two groups ( $p = 0.956$ ). There was no significant difference between the two groups in terms of anthropometric parameters ( $p > 0.05$ ) Table 1.).

The frequency of hirsutism in the girls with oligomenorrhea was 27.9%, whereas it was 5.9% in the control group. 61.8 % of girls with oligomenorrhea had polycystic ovarian appearance in TPU. It was also 27.9% in control group. Among adolescent girls with oligomenorrhea, androstenedione levels were significantly higher in the cases of hirsutism than those without hirsutism ( $p < 0.001$ ) (Figure 1).

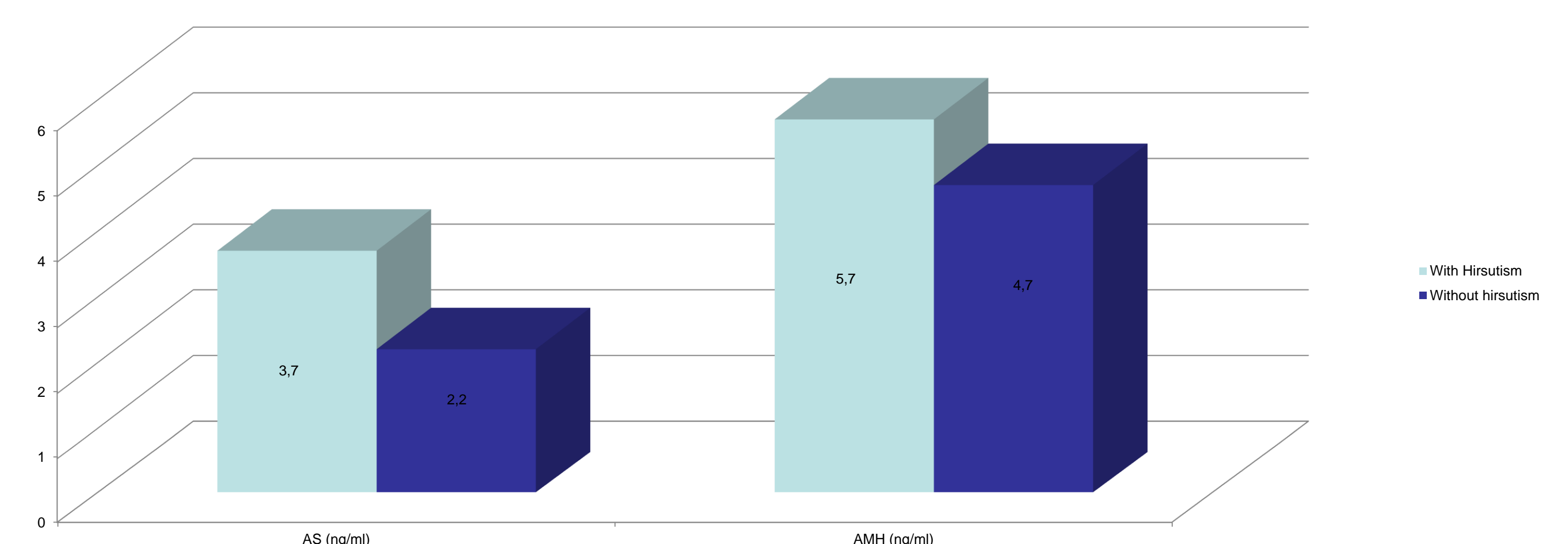
There was positive correlation between Body Mass Index (BMI) and androstenedione levels ( $r: 0.269$ ,  $p: 0.022$ ).

Groups were evaluated by Student t test..

**Table 1.** Biochemical and anthropometric parameters of the patients and control group

Parameters	Adolescent girls with oligomenorrhea n: 68	Adolescent girls with regular menstrual period n: 64	p value
Age (year)	17.1±0.97	17.02±0.93	0.661
Menarcheal age (year)	12.58±1.0	12.59±1.0	0.956
Height SDS	-0.14±1.1	-0.21±1.0	0.717
BMI SDS	0.29±1.1	-0.00±1.1	0.148
Androstenedione (ng/ml)	2.63±1.33	2.17±0.88	0.024
AMH (ng/ml)	4.95±2.94	3.27±1.45	<0.001

Anti-Mullerian Hormone (AMH), Standard Deviation Score (SDS), Body Mass Index (BMI)



**Figure 1.** Androstenedione (AS) and AMH levels in the presence and absence of hirsutism in adolescent girls with oligomenorrhoea. Androstenedione levels were significantly higher in the cases of hirsutism than those without hirsutism ( $p < 0.001$ ).

## Conclusion

Hirsutism and polycystic appearance in TPU which are important components of PCOS are more common in adolescents girls with oligomenorrhea. Adolescent girls with oligomenorrhea have higher androstenedione and AMH levels than girls with regular menstruation. The high AMH level is one of the diagnostic criteria for PCOS. High androstenedione level may be an important determinant in hirsutism, as it is a sensitive marker of hyperandrogenemia in adolescents with PCOS. High androstenedione levels are associated with high BMI values. High androstenedione levels seem to have the adverse effect on the metabolic phenotype in these patients.

