

## Serum Anti-Müllerian hormone as laboratory predictor in infertile women with and without polycystic ovary syndrome

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### Abstract

Anti-Müllerian hormone (AMH) is glycoprotein produced by the ovarian follicles; used as an endocrine marker for ovarian aging in normogonadotropic and anovulatory infertile women. The aim of this study is to assess serum AMH levels in 202 infertile women without polycystic ovary syndrome (PCOS), 67 infertile women diagnosed with PCOS, and 31 normal fertile women as control. The study revealed that the mean serum AMH in infertile women was (0.68±1.14 U/L), and (14.57±6.00 U/L) in women with PCOS, while (3.619±1.17U/L) in the control group. The mean age for infertile women with and without PCOS was (38.4±4.7) &35.6±5.2yrs) respectively; versus (32.19±6.25yrs) for the normal fertile women.

AMH is significantly elevated in PCOS, while it's significantly lowered in the infertile women without PCOS. AMH is not significantly changed throughout the regularity of menstrual cycle. Serum AMH is a good laboratory predictor for diagnosing PCOS, and a sensitive marker for ovarian reserved antral follicles.

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## Introduction

Antimullerian hormone (AMH) also known as mullerian inhibiting substance is a glycoprotein dimer which consists of 72 KD monomers linked by disulphide bonds. It belongs to the member of the transforming growth factor superfamily <sup>(1)</sup>. It is produced by the ovarian follicular granulosa cells from the 36<sup>th</sup> week of gestation <sup>(2, 1)</sup>. Its concentration correlates with the number of antral follicles as well as age of the women <sup>(3)</sup>. AMH peaks at age 24.5 years, followed by a decline to the menopause <sup>(4)</sup>. AMH values decrease steadily in a manner highly correlated with advancing age. The average yearly decrease is higher through age 35. On the other hand, a lower AMH level predicts poor ovarian response especially in invitro fertilization process <sup>(5)</sup>. Circulating AMH in serum or follicular fluid is high in the patients with polycystic ovary syndrome (PCOS). This disease is a known common reproductive endocrine disorder, affecting about 5-12% of women. In PCOS; excessive amounts of androgens are produced by the ovaries. PCOS is a common cause of infertility, menstrual irregularity, anovulation and hirsutism <sup>(6,7)</sup>.

AMH measurement is valuable because, it can be useful in predicting ovarian hyperstimulation, multifollicular complications and may be a novel marker for ovarian aging as well as evaluating treatment efficacy in PCOS <sup>(8, 9, 10)</sup>.

## Materials and methods

A cross sectional study was conducted at Reproductive Health Care center, in Khartoum-Sudan, during December 2012 to November 2013. The study populations were infertile females aged 24 to 50 years, 67 of them had POCS as a cause of Infertility, while the 202 had different causes of infertility other than POCS, and 31 known fertile women as control. The infertile group was divided into three groups (20-29, 30-39 & 40-50 years). Ethical clearance was obtained from the ethical committee in Alneelain University. The Informed consents were taken before blood collection. Five milliliters of venous blood were collected from all subjects in a plain container using vacutainer. Serum was separated using electric centrifuge at 3000 RPM for five minutes. Serum AMH was measured using (Gen II ELISA) technique. All reagents and controls were from Beckman Coulter. Statistical data analysis was done using Statistical Package for Social Sciences (SPSS version 16).

## Results

A total number of 300 AMH results were analyzed (Table. 1). The mean value of AMH was estimated to be was (14.57±6.00 U/L) in infertile women with PCOS, and (0.68±1.14 U/L) in infertile women without PCOS compared to (3.619±1.17U/L) in the control group. These results revealed significantly higher level of AMH in infertile women with PCOS (P value 0.00). The study also showed statistically significant low level of AMH among infertile women without PCOS (P value 0.00). The study also showed no significantly difference in serum AMH values in different age groups or between the women with regular and irregular cycles (Figure. 1).

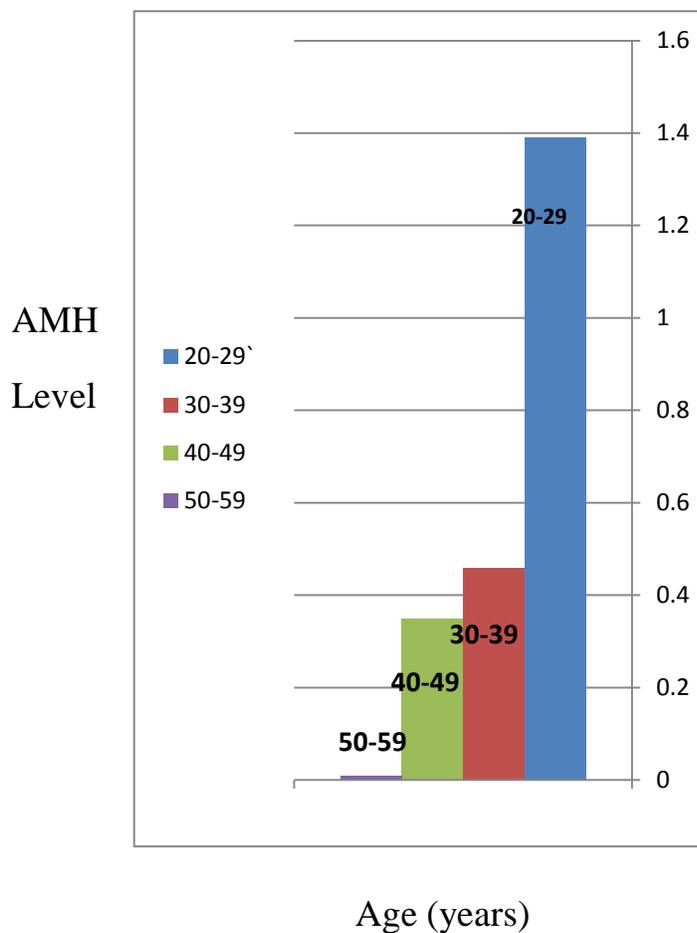
**Table (1) Mean serum levels of AMH among the groups of women under study and their controls**

Parameters	Women with PCOS (n=67) (Mean ±Std)	Infertile women without PCOS (n=202) (Mean ±Std)	Fertile control women (n = 31) (Mean ±Std)	P value
AMH(U/L)	14.57±6.00	0.683±1.14	3.619±1.17	0.00
Age (years)	35.6±5.2	38.4±4.7	32.19±6.25	

## Discussion

Recent socioeconomic changes in Sudan have resulted in an increasing number of women delaying marriage and hence childbirth. At late age until later their fertility is significantly compromised compared to younger women. This has created strong demand for fertility services. AMH is a good endocrine predictor for ovarian aging as reported by Laven and coworkers (2004)<sup>3</sup>. In the present study, which is conducted to assess serum levels of AMH, in infertile

women with and without PCOS and to evaluate the serum levels AMH as marker for ovarian response. The study showed a significant decrease in serum concentration of AMH in infertile women compared to fertile control women ( $p= 0.00$ ). This finding is in agreement with that reported by Seifer and colleagues (2011)<sup>5</sup>. The study also revealed a significantly increase mean serum levels of AMH of in with PCOS. This finding is consistent with that reported by many authors<sup>(8, 13, 14)</sup>. This excess of AMH may be due to increased number of small antral follicles that produce AMH; as stated by Parahuleva and colleagues, (2012)<sup>14</sup>.



**Figure (1) Serum AMH (U/L) Levels in infertile women without PCOS in relation to age groups (n=202).**

AMH determination has high specificity and sensitivity as a diagnostic laboratory criterion for PCOS, since there is no significantly test used for PCOS diagnosis <sup>(7)</sup>. In Sudan serum AMH can help in the rural areas where advance ultrasound is not available. In assisted reproductive services, suspected ovarian response is strongly needed, where serum AMH plays an important rule. In conclusion AMH is significantly decreased in infertile Sudanese women and significantly elevated in Sudanese women with PCOS.

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### References

1. Kalaiselvi V S, Saikumar P, Prabhu K, and Prashanth Krishna G. The Anti Mullerian Hormone- A Novel Marker for Assessing the Ovarian Reserve in Women with Regular Menstrual Cycles. J Clin Diagn Res. 2012; 6(10): 1636–1639
2. Marbut Musa, Razaw Omer Ibrahim, Alya Khedher Ghalib. The role of serum anti-Mullerian hormone in assessment of ovarian function in infertile women in Kirkuk. Tikret Journal of Pharmaceutical Sciences. 2012,vol 8(1): 29-34.
3. Laven JS, Mulders AG, Visser JA, Themmen AP, De Jong FH, Fauser BC. Anti-Müllerian hormone serum concentrations in normoovulatory and anovulatory women of reproductive age. J Clin Endocrinol Metab. 2004 Jan;89(1):318-23
4. Thomas W. Kelsey, Phoebe Wright, Scott M. Nelson, Richard A. Anderson, W. Hamish B. Wallace. A Validated Model of Serum Anti-Mu'llerian Hormone from Conception to Menopause. PLoS ONE | www.plosone.org. 2011, 6 ( 7) e22024.
5. Seifer DB, Baker VL, Leader B. Age-specific serum anti-Müllerian hormone values for 17,120 women presenting to fertility centers within the United States. Fertil Steril. 2011 Feb; 95(2):747-50.
6. Parahuleva N, Pehlivanov B, Dimitrakova E, Malinova M, Mladenova M. Anti-Mullerian hormone- its role in the pathogenesis of the polycystic ovary syndrome. Akush Ginekol (Sofii). 2012; 51 (6):22-6.

7. Eltayeb Tayrab, A.alhafiz Khattab, A/Lateif Ashmaig. Follicular fluid of women with polycystic ovary syndrome. Lambert Academic Publishing –Germany (2013).
8. Pigny P, Emilie M, Yann R, Christine C R, Christine D, Sophie J and Didier D. Elevated Serum Level of Anti-Mullerian Hormone in Patients with Polycystic Ovary Syndrome: Relationship to the Ovarian Follicle Excess and to the Follicular Arrest. J Clin Endocrinol Metab. 2003; 88 (12):5957-62.
9. de Vet A, Laven JS, de Jong FH, Themmen AP, Fauser BC. Antimüllerian hormone serum levels: a putative marker for ovarian aging. Fertil Steril. 2002, 77(2):357-62.
10. Piltonen T, Laure M P, Riitta K, Antti P, Aimo R and Juha S T. Serum anti-Müllerian hormone levels remain high until late reproductive age and decrease during metformin therapy in women with polycystic ovary syndrome. Human Reproduction. 2005, Vol.20 (7): 1820–1826
11. Tehrani FR, Solaymani-Dodaran M, Hedayati M, Azizi F. Is polycystic ovary syndrome an exception for reproductive aging?. Hum Reprod. 2010 Jul;25(7):1775-81
12. Pehlivanov BK, Orbetzova MM. Anti-Müllerian hormone in women with polycystic ovary syndrome. Folia Med (Plovdiv). 2011, 53(1):5-10.
13. Desforges-Bullet V, Gallo C, Lefebvre C, Pigny P, Dewailly D, Catteau-Jonard S. Increased anti-Müllerian hormone and decreased FSH levels in follicular fluid obtained in women with polycystic ovaries at the time of follicle puncture for in vitro fertilization. Fertil Steril. 2010; 94(1):198-204.
14. Catteau-Jonard S, Dewailly D. Anti-Mullerian hormone and polycystic ovary syndrome. Gynecol Obstet Fertil. 2011; 39 (9):514-7.