(ISSN Online: 3006-1113) Full Paper

Libyan Journal of Medical and Applied Sciences

Journal homepage: https://ljmas.com/index.php/journal/index

A RESEARCH ARTICLE

# Comparative Assessment of FSH, LH, Testosterone, Prolactin, and Body Mass Index in Women with Polycystic Ovary Syndrome: A Case-Control Study

Raghad Jabbar Abdul Sahib [a]

[a] Directorate of Education Maysan, Ministry of Education, Iraq.

**Article Information**

**Article history:**
Received on:09/Sep/2026
Revised on: 08/Nov/2026
Accepted on: 014/Nov/2026
Available online:20/Nov/2026
Published on: 06/Dec/2026

**Keywords:**
Polycystic ovary syndrome; PCOS; FSH; LH; LH/FSH ratio; Testosterone; Prolactin; Body mass index.

**Corresponding author:**

Raghad Jabbar Abdul Sahib, Directorate of Education Maysan, Ministry of Education, Iraq.

## Abstract

**Background:** Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders affecting women of reproductive age and is characterized by hormonal and metabolic disturbances. Objective: This study aimed to compare reproductive hormone levels, the LH/FSH ratio, and body mass index (BMI) between women with PCOS and healthy controls, and to evaluate the correlation between BMI and hormonal parameters in women with PCOS. **Methods:** A case-control study was conducted involving 80 women, including 40 women diagnosed with PCOS and 40 healthy controls. Serum levels of follicle-stimulating hormone (FSH), luteinizing hormone (LH), testosterone, and prolactin were measured using standard laboratory methods. BMI was calculated for all participants. Statistical analyses included the independent samples t-test and Pearson's correlation analysis, with statistical significance set at $P < 0.05$. **Results:** Women with PCOS had significantly lower FSH levels and significantly higher BMI, testosterone, prolactin, and LH/FSH ratio than healthy controls ($P < 0.05$). Although LH levels were higher in the PCOS group, the difference was not statistically significant ($P = 0.086$). Pearson's correlation analysis revealed no significant associations between BMI and the measured hormonal parameters in women with PCOS. **Conclusion:** Women with PCOS exhibit significant endocrine and metabolic alterations compared with healthy controls. Assessment of reproductive hormones, LH/FSH ratio, and BMI may improve the clinical evaluation of PCOS. However, BMI was not significantly correlated with hormonal parameters in the studied population.

Copyright © 2026 Author(s); Distributed under Creative Commons CC-BY 4.0
LJMAS. Published by Higher Institute of Medical Science and Technology, Bani Walid, Libya.

## 1. INTRODUCTION

Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders affecting women of reproductive age, with an estimated prevalence of 5–10% worldwide[1]. It is characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology, leading to reproductive and metabolic complications [2,3]. Polycystic ovary syndrome (PCOS) has a complex pathophysiology involving disruptions in the hypothalamic-pituitary-ovarian axis, leading to abnormal secretion of reproductive hormones, including luteinizing hormone (LH) and follicle-stimulating hormone (FSH). Numerous studies have investigated the LH/FSH ratio as an important hormonal indicator in women with PCOS, and it can help assess the hormonal dysfunction associated with this syndrome [4,5]. These hormonal alterations contribute to excessive ovarian androgen production, follicular arrest, menstrual irregularities, and infertility [6,7]. Hyperandrogenism is considered a hallmark of PCOS and plays a central role in the development of the clinical manifestations of the syndrome. Elevated testosterone levels are associated with impaired follicular development and ovulatory dysfunction [8]. Some women with polycystic ovary syndrome have slightly elevated prolactin levels, and this can have a greater impact on reproductive function. [9,10].Obesity is another common feature associated with PCOS and may worsen hormonal and metabolic abnormalities. Women with PCOS frequently have higher body mass index (BMI), which is associated with adverse reproductive and metabolic outcomes [11,12]. Therefore, this study aimed to compare the reproductive hormone profile, LH/FSH ratio, and body mass index (BMI) between women with PCOS and healthy controls, and to evaluate the correlation between BMI and hormonal parameters in women with PCOS.



DOI: https://doi.org/10.64943/ljmas.2026.040403

## 2. MATERIALS AND METHODS

### 2.1.Study Design and Participants

A case-control study was conducted involving 80 women aged 18–40 years. The participants were divided into two groups: 40 women diagnosed with polycystic ovary syndrome (PCOS) and 40 healthy women who served as the control group. The diagnosis of PCOS was based on the Rotterdam criteria, which require the presence of at least two of the following: oligo/anovulation, clinical or biochemical hyperandrogenism, and polycystic ovarian morphology.

### 2.2.Sample Collection

Venous blood samples (5 mL) were collected from all participants after an overnight fast during the early follicular phase of the menstrual cycle (days 2–5). Blood samples were centrifuged, and serum was separated and stored at −20°C until laboratory analysis.

### 2.3. Hormonal Analysis

Serum levels of follicle-stimulating hormone (FSH), luteinizing hormone (LH), testosterone, and prolactin were measured using enzyme-linked immunosorbent assay (ELISA) according to the manufacturer's instructions. Body mass index (BMI) was calculated using the standard formula: BMI = Weight (kg) / Height ($m^2$)**[12].**

### 2.4.Statistical Analysis

Data were analyzed using Jamovi software (version 2.3.28). Quantitative variables were expressed as mean ± standard deviation (Mean ± SD). Differences between women with PCOS and healthy controls were assessed using the independent samples t-test. Pearson's correlation coefficient was used to evaluate the relationship between body mass index (BMI) and hormonal parameters within the PCOS group. A P-value < 0.05 was considered statistically significant.

### 2.5. Ethical Considerations

All participants were informed about the purpose of the study, and verbal informed consent was obtained before sample collection. Participants' personal information was kept confidential, and all data were used exclusively for scientific research purposes.

## 3. RESULTS

A total of 80 women were enrolled in this study, including 40 women diagnosed with PCOS and 40 healthy controls. The hormonal profile, LH/FSH ratio, and body mass index (BMI) were compared between the two groups.

### 3.1. Hormonal and Biochemical Parameters

Table 1 presents the comparison of body mass index (BMI) and reproductive hormone levels between women with PCOS and healthy controls. Women with PCOS had a significantly higher BMI than healthy controls (P < 0.001). Serum FSH levels were significantly lower in the PCOS group, whereas testosterone and prolactin levels were significantly higher than those in the control group (P < 0.05). Although the mean LH level was higher in women with PCOS, the difference was not statistically significant (P = 0.086). These findings indicate significant endocrine and metabolic alterations in women with PCOS. The comparison of hormone levels is illustrated in Figure 1.

**Table 1.** Comparison of body mass index (BMI) and reproductive hormone levels between women with PCOS and healthy controls

| Parameter | PCOS (Mean ± SD) | Control (Mean ± SD) | P-value |
|---|---|---|---|
| **BMI ($kg/m^2$)** | 29.9 ± 1.18 | 25.2 ± 3.50 | <0.001 |
| **FSH (mIU/mL)** | 3.58 ± 1.54 | 4.61 ± 1.96 | 0.036 |
| **LH (mIU/mL)** | 6.67 ± 2.23 | 5.76 ± 2.43 | 0.086 |
| **Testosterone(ng/ml)** | 68.3 ± 11.8 | 32.2 ± 12.5 | <0.001 |
| **Prolactin(ng/ml)** | 23.1 ± 13.0 | 6.36 ±0.84 | <0.001 |

Data are presented as mean ± standard deviation (SD). Comparisons between groups were performed using the independent samples t-test. A P-value < 0.05 was considered statistically significant.

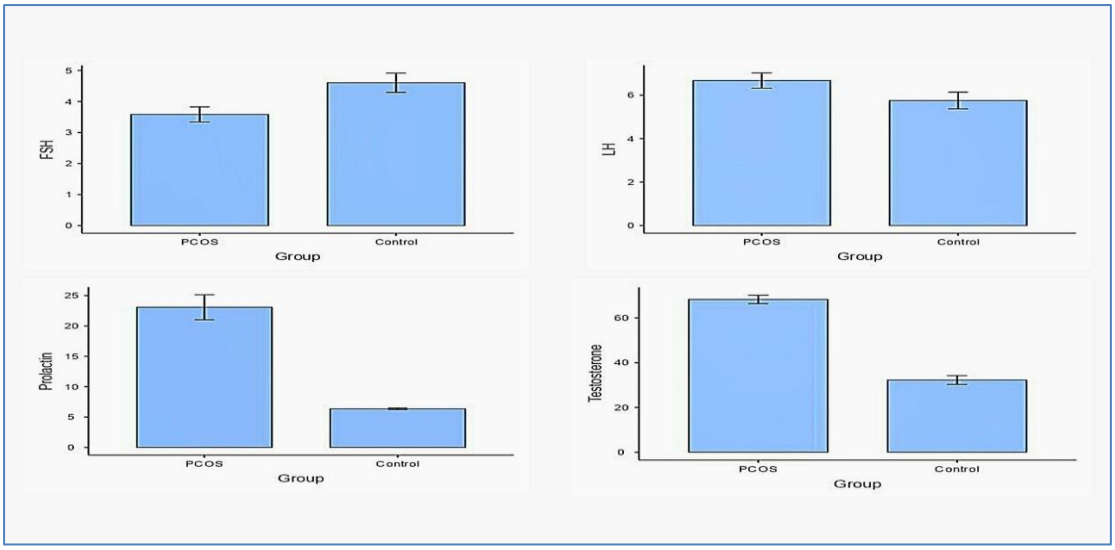



**Figure 1.** Comparison of reproductive hormone levels between PCOS and controls

### 3.2 Comparison of the LH/FSH Ratio

Table 2 shows the comparison of the LH/FSH ratio between women with PCOS and healthy controls. The mean LH/FSH ratio was significantly higher in women with PCOS (2.22 ± 1.21) than in healthy controls (1.42 ± 0.84), with a statistically significant difference (P = 0.001).

**Table 2.** Comparison of the LH/FSH ratio between women with PCOS and healthy controls

| Group | N | LH / FSH Ratio (Mean ± SD) | P-value |
|---|---|---|---|
| **PCOS** | 40 | 2.22±1.21 | 0.001 |
| **Control** | 40 | 1.42± 0.84 | |

Data are presented as mean ± SD. Comparisons between groups were performed using the independent samples t-test. A P-value < 0.05 was considered statistically significant.

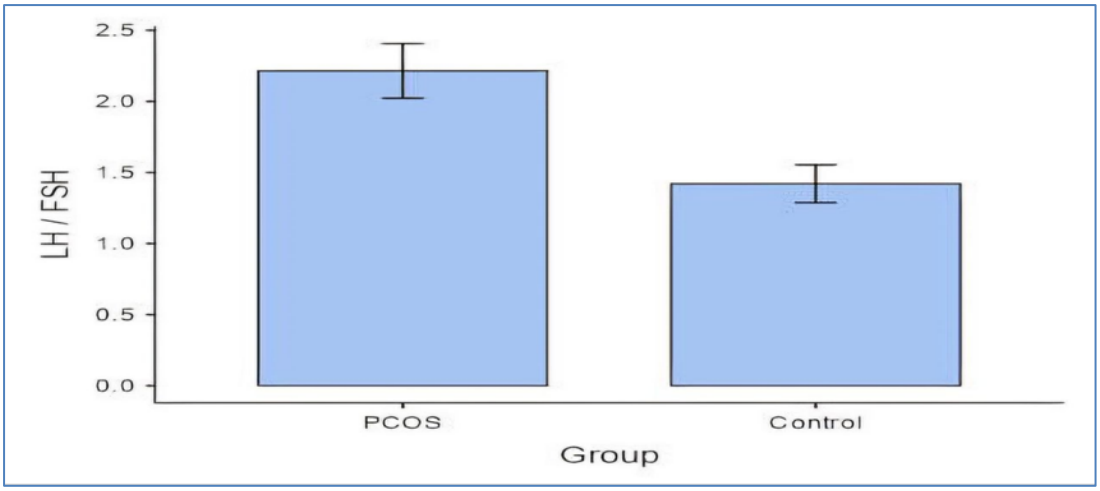



**Figure 2.** Comparison of the LH/FSH ratio between women with PCOS and healthy controls

### 3.3.Correlation between body mass index (BMI) and hormonal parameters in women with PCOS

Table 3 presents the correlation analysis between BMI and hormonal parameters in women with PCOS. Pearson's correlation analysis revealed no statistically significant associations between BMI and FSH (r = 0.008, P = 0.959), LH (r = −0.055, P = 0.736), LH/FSH ratio (r = −0.038, P = 0.815), testosterone (r = 0.077, P = 0.635), or prolactin (r = 0.079, P = 0.629). These findings indicate that BMI was not significantly correlated with the measured hormonal parameters in the studied PCOS population. The correlation matrix is illustrated in Figure 3.

**Table 3.** Correlation between BMI and hormonal parameters in women with PCOS

| Variable | FSH | LH | LH/FSH ratio | Testosterone | Prolactin |
|---|---|---|---|---|---|
| **Pearson's r** | 0.008 | -0.055 | -0.038 | 0.077 | 0.079 |
| **P-value** | 0.959 | 0.736 | 0.815 | 0.635 | 0.629 |

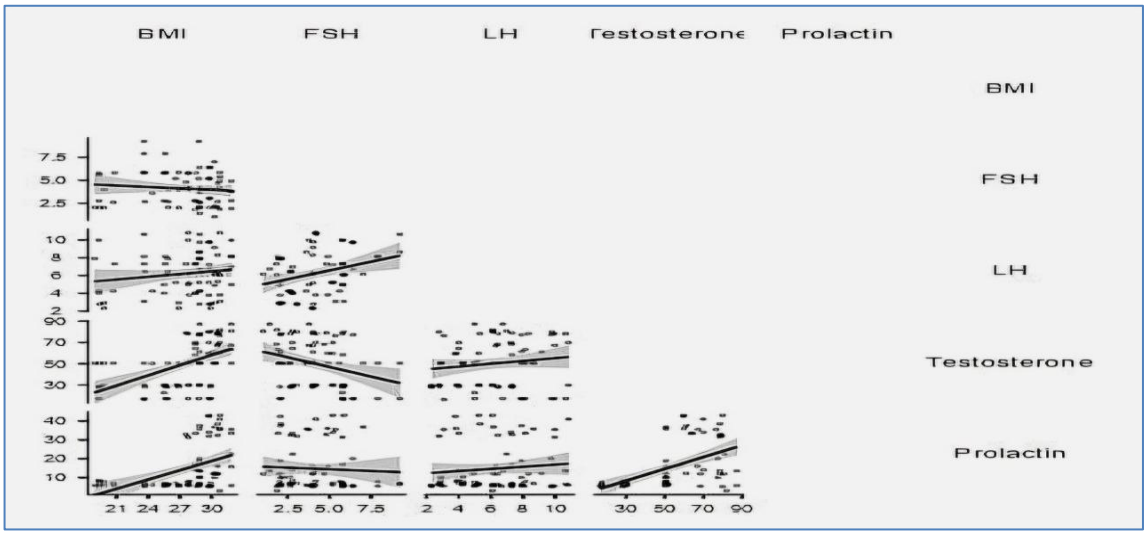



**Figure 3.** Scatterplot matrix showing the correlations between BMI and hormonal parameters in women with PCOS(N=40)

### 4. DISCUSSION

This study investigated differences in reproductive hormone levels, the luteinizing hormone (LH) to follicle-stimulating hormone (FSH) ratio, and body mass index (BMI) between women with polycystic ovary syndrome (PCOS) and healthy women. The results showed significantly lower serum FSH levels in women with PCOS and significantly higher levels of testosterone, prolactin, LH/FSH ratio, and BMI compared to healthy women [14,15]. Although serum LH levels were higher in the PCOS group, this difference was not statistically significant. No statistically significant correlations were observed between BMI and the measured hormonal parameters in women with PCOS. These findings support the existence of complex endocrine and metabolic disorders associated with PCOS [16]. This marked decrease in follicle-stimulating hormone (FSH) levels in women with polycystic ovary syndrome (PCOS) explains the impaired follicular development and dysfunction of the hypothalamic-pituitary-ovarian axis [17,18]. Reduced FSH stimulation contributes to the arrest of follicular maturation and chronic anovulation, both hallmarks of PCOS, although LH levels are elevated in women with PCOS, this is not statistically significant, the markedly elevated LH/FSH ratio supports the presence of gonadotropin-releasing dysfunction, a hormonal disorder characteristic of PCOS [19,20,21]. Hyperandrogenism is a key feature of PCOS. In this study, serum testosterone levels were significantly higher in women with polycystic ovary syndrome (PCOS) compared to healthy women, consistent with previous reports indicating that excessive ovarian androgen production plays a pivotal role in PCOS development and contributes to follicular arrest, menstrual irregularities, and infertility [22,23]. Prolactin concentrations were also significantly elevated in women with PCOS. Mild hyperprolactinemia has been described in a percentage of women with PCOS and may exacerbate impaired reproductive function by affecting ovulation and the regulation of the

hypothalamic-pituitary-ovarian axis [24,25]. Women with polycystic ovary syndrome (PCOS) also exhibited a significantly higher body mass index (BMI) than healthy women, supporting previous evidence that obesity often accompanies PCOS and may exacerbate its hormonal and metabolic symptoms [26,27,28]. Pearson correlation analysis found no statistically significant association between body mass index (BMI) and follicle-stimulating hormone (FSH), luteinizing hormone (LH), LH/FSH ratio, testosterone, or prolactin levels in the group of women with polycystic ovary syndrome (PCOS). This suggests that variations in BMI within the study sample were not independently associated with hormonal changes. The lack of statistically significant correlations may be due to the relatively small sample size, the limited variability in BMI, or the hormonal regulatory factors in PCOS. These findings confirm that PCOS is characterized by significant hormonal and metabolic disturbances. Assessing reproductive hormone levels, LH/FSH ratio, and BMI may contribute to a more accurate clinical evaluation of women with PCOS. Further studies involving larger and more diverse groups of women are recommended to clarify the relationship between obesity and hormonal imbalances, and to identify additional factors affecting the clinical symptoms of polycystic ovary syndrome. Larger sample studies are also recommended to determine the accuracy of these findings.

## 5. CONCLUSION

This study demonstrated significant endocrine and metabolic differences between women with PCOS and healthy controls. Women with PCOS exhibited significantly lower FSH levels and significantly higher BMI, testosterone, prolactin, and LH/FSH ratio, whereas the difference in LH levels was not statistically significant. Furthermore, no significant correlations were observed between BMI and the measured hormonal parameters within the PCOS group. These findings highlight the complex pathophysiology of PCOS and emphasize the importance of comprehensive hormonal assessment together with BMI evaluation in the clinical management of affected women. Further studies with larger sample sizes are recommended to validate these findings and explore additional metabolic and endocrine factors associated with PCOS.

## 6. CONFLICT INTEREST

The author declare that there are no financial, personal, professional, or institutional conflicts of interest that could have influenced the design, conduct, analysis, or reporting of this study. The authors further confirm that they have no competing interests related to the publication of this manuscript.

## REFERENCES


1. Bai, H., Ding, H., & Wang, M. (2024). Polycystic ovary syndrome (PCOS): symptoms, causes, and treatment. *Clinical and Experimental Obstetrics & Gynecology*, 51(5), 126.
2. Zehravi, M., Maqbool, M., & Ara, I. (2021). Polycystic ovary syndrome and reproductive health of women: a curious association. *International journal of adolescent medicine and health*, 33(6), 333-337.
3. Stener-Victorin, E., Teede, H., Norman, R. J., Legro, R., Goodarzi, M. O., Dokras, A., ... & Piltonen, T. T. (2024). Polycystic ovary syndrome. *Nature reviews Disease primers*, *10*(1), 27. https://doi.org/10.1038/s41572-024-00511-3
4. 4.Su, P., Chen, C. & Sun, Y. Physiopathology of polycystic ovary syndrome in endocrinology, metabolism and inflammation. *J Ovarian Res* **18**, 34 (2025). https://doi.org/10.1186/s13048-025-01621-6
5. Harada, M. (2022). Pathophysiology of polycystic ovary syndrome revisited: Current understanding and perspectives regarding future research. *Reproductive medicine and biology*, *21*(1), e12487. https://doi:10.1002/rmb2.12487
6. Lonardo, M. S., Cacciapuoti, N., Guida, B., Di Lorenzo, M., Chiurazzi, M., Damiano, S., & Menale, C. (2024). Hypothalamic-ovarian axis and adiposity relationship in polycystic ovary syndrome: physiopathology and therapeutic options for the management of metabolic and inflammatory aspects. *Current Obesity Reports*, 13(1), 51-70. https://doi.org/10.1007/s13679-023-00531-2

7. Abdul-Sahib, R. J., & Faraj, S. H. (2023). MOLECULAR ANALYSIS OF CYP17 GENE PROMOTER IN IRAQI INFERTILE WOMEN. Ann. For. Res, 66(1), 2518-2525.
8. Afsana, F. (2025). Role of Hyperandrogenism in PCOS Pathogenesis. In Current and Emerging Concepts of Polycystic Ovary Syndrome Manual from MP PCOS Society (Part 1) (pp. 101-108). *Bentham Science Publishers*. https://doi.org/10.2174/9798898810931125010 1
9. Unluhizarci, K., Karaca, Z., & Kelestimur, F. (2021). Role of insulin and insulin resistance in androgen excess disorders. World journal of diabetes, 12(5), 616. https://doi.org/10.4239/wjd.v12.i5.616
10. Mastnak, L., Herman, R., Ferjan, S., Janež, A., & Jensterle, M. (2023). Prolactin in polycystic ovary syndrome: metabolic effects and therapeutic prospects. *Life*, *13*(11), 2124.https://doi.org/10.3390/life13112124
11. Lim, S. S., Kakoly, N. S., Tan, J. W. J., Fitzgerald, G., Bahri Khomami, M., Joham, A. E., ... & Moran, L. J. (2019). Metabolic syndrome in polycystic ovary syndrome: a systematic review, meta analysis and metaregression. *Obesity reviews,* 20(2), 339-352. https://doi.org/10.1111/obr.12762
12. Barber, T. M., & Franks, S. (2021). Obesity and polycystic ovary . *Clin Endocrinol (Oxf)*. 2021; 95: 531–541.https://doi.org/10.1111/cen.14421
13. Heymsfield, S. B., Sorkin, J. D., Thomas, D. M., Yang, S., Heo, M., McCarthy, C., ... & Pietrobelli, A. (2025). Weight/height2: Mathematical overview of the world's most widely used adiposity index. *Obesity Reviews*, *26*(1), e13842.doi:10.1111/obr.13842
14. Alhassan, S., Elmugadam, A., Elfadil, G. A., Abubaker, N., Elfaki, E. M., Hamza, A., ... & Karar, T. (2023). Diagnostic performance of anti-Müllerian hormone, luteinizing hormone to follicle-stimulating hormone ratio, testosterone, and prolactin to predict polycystic ovary syndrome among Sudanese women. *International Journal of Women's Health*, 837-843.**https://doi.org/10.2147/IJWH.S403347**
15. Yang, J., & Chen, C. (2024). Hormonal changes in PCOS. *Journal of Endocrinology*, *261*(1).**https://doi.org/10.1530/JOE-23-0342**
16. Mahmud, A. A., Anu, U. H., Foysal, K. A., Hasan, M., Sazib, S. M., Ragib, A. A., ... & Emran, T. B. (2022). Elevated serum malondialdehyde (MDA), insulin, follicle-stimulating hormone (FSH), luteinizing hormone (LH), and thyroid-stimulating hormone (TSH), and reduced antioxidant vitamins in polycystic ovarian syndrome patients. *Narra J*, *2*(1), e56. **https://doi.org/10.52225/narra.v2i1.56**
17. Najdgholami, Z., Sedgi, F. M., Ghalishourani, S. S., Feyzpour, M., & Rahimlou, M. (2025). Flaxseed intervention and reproductive endocrine profiles in patients with polycystic ovary syndrome: an open-labeled randomized controlled clinical trial. *Frontiers in endocrinology*, *16*, 1531762. **https://doi: 10.3389/fendo.2025.1531762**
18. Xu, J., Chen, W. H., Huang, M. N., Zheng, L. T., Huang, S. Y., Lin, S., & Shi, Q. R. (2025). Recent advances in reprogramming lactate metabolism in polycystic ovary syndrome. *Journal of Ovarian Research*, *18*(1), 221. https://doi.org/10.1186/s13048-025-01797-x
19. McCartney, C. R., Campbell, R. E., Marshall, J. C., & Moenter, S. M. (2022). The role of gonadotropin-releasing hormone neurons in polycystic ovary syndrome. *Journal of neuroendocrinology*, *34*(5), e13093. doi:10.1111/jne.13093
20. Abdul-Sahib, R. J., & Faraj, S. H. (2026). Association of FSHβ gene (−211 G>T) polymorphism with infertility in Iraqi women in Maysan Governorate. Libyan Journal of Ecological & Environmental Sciences and Technology, 8(2), 22–27. https://doi.org/10.63359/d8bcyj16
21. Ruddenklau, A., & Campbell, R. E. (2019). Neuroendocrine impairments of polycystic ovary syndrome. *Endocrinology*, *160*(10), 2230-2242. https://doi.org/10.1210/en.2019-00428
22. Ding, H., Zhang, J., Zhang, F., Zhang, S., Chen, X., Liang, W., & Xie, Q. (2021). Resistance to the insulin and elevated level of androgen: a major cause of polycystic ovary

syndrome. *Frontiers in endocrinology*, *12*, 741764.. https://doi.org/10.3389/fendo.2021.741764
23. Wang, K., Li, Y., & Chen, Y. (2023). Androgen excess: a hallmark of polycystic ovary syndrome. *Frontiers in endocrinology*, *14*, 1273542. https://doi.org/10.3389/fendo.2023.1273542
24. Athar, F., Karmani, M., & Templeman, N. M. (2024). Metabolic hormones are integral regulators of female reproductive health and function. *Bioscience reports*, *44*(1), BSR20231916. https://doi.org/10.1042/BSR20231916
25. Chen, X., Wan, Y., & Xie, L. (2025). Insulin resistance in polycystic ovary syndrome: pathophysiological mechanisms of menstrual dysfunction and evidence-based treatment strategies. *Biology of Reproduction*, *113*(6), 1340-1354. https://doi.org/10.1093/biolre/ioaf197
26. Rambaran, N., & Islam, M. S. (2025). Decoding androgen excess in polycystic ovary syndrome: Roles of insulin resistance and other key intraovarian and systemic factors. *World journal of diabetes*, *16*(7), 108789. https://doi.org/10.4239/wjd.v16.i7.108789
27. Szybiak-Skora, W., Cyna, W., & Lacka, K. (2025). New insights in the diagnostic potential of sex hormone-binding globulin (SHBG)—clinical approach. *Biomedicines*, *13*(5), 1207.https://doi.org/10.3390/biomedicines13051207
28. Jabbar, R. (2026). Association Between Age, Body Mass Index, and Hypertension Among Adults in Maysan Governorate, Iraq: A Cross-Sectional Study. Libyan Journal of Applied and Contemporary Sciences, 50–58. https://doi.org/10.64943/ljacs.2026.010205.

## التقييم المقارن لهرمونFSH ، وهرمونLH ، والتستوستيرون، والبرولاكتين، ومؤشر كتلة الجسم لدى النساء المصابات بمتلازمة تكيس المبايض: دراسة حالة مراقبة

**المستلخص**

**الخلفية:** تُعد متلازمة تكيس المبايض (PCOS) من أكثر اضطرابات الغدد الصماء شيوعًا التي تصيب النساء في سن الإنجاب، وتتميز باضطرابات هرمونية واستقلابية. **الهدف**: هدفت هذه الدراسة إلى مقارنة مستويات الهرمونات التناسلية، ونسبةLH/FSH ، ومؤشر كتلة الجسم (BMI) بين النساء المصابات بمتلازمة تكيس المبايض ومجموعة ضابطة من النساء السليمات، وتقييم العلاقة بين مؤشر كتلة الجسم والمعايير الهرمونية لدى النساء المصابات بمتلازمة تكيس المبايض. **المواد وطرق العمل**: أُجريت دراسة حالة-مراقبة شملت 80 امرأة، من بينهن 40 امرأة مصابة بمتلازمة تكيس المبايض و40 امرأة سليمة كمجموعة ضابطة. تم قياس مستويات هرمون تحفيز الجريبات(FSH) ، والهرمون اللوتيني(LH) ، والتستوستيرون، والبرولاكتين في مصل الدم باستخدام الطرق المختبرية المعيارية. حُسب مؤشر كتلة الجسم (BMI) لجميع المشاركات. شملت التحليلات الإحصائية اختبار t للعينات المستقلة وتحليل ارتباط بيرسون، مع اعتبار الدلالة الإحصائية عند $P < 0.05$. **النتائج:** كان لدى النساء المصابات بمتلازمة تكيس المبايض مستويات أقل بكثير من هرمونFSH ، ومؤشر كتلة جسم، ومستويات أعلى بكثير من التستوستيرون، والبرولاكتين، ونسبة LH/FSH مقارنةً بالمجموعة الضابطة السليمة ($P < 0.05$). على الرغم من أن مستويات LH كانت أعلى في مجموعة متلازمة تكيس المبايض، إلا أن الفرق لم يكن ذا دلالة إحصائية ($P = 0.086$). لم يكشف تحليل ارتباط بيرسون عن أي ارتباطات ذات دلالة إحصائية بين مؤشر كتلة الجسم والمعايير الهرمونية المقاسة لدى النساء المصابات بمتلازمة تكيس المبايض. **الاستنتاج**: تُظهر النساء المصابات بمتلازمة تكيس المبايض تغيرات هرمونية واستقلابية كبيرة مقارنةً بالمجموعة الضابطة السليمة. قد يُحسّن تقييم الهرمونات التناسلية، ونسبةLH/FSH ، ومؤشر كتلة الجسم (BMI) من التقييم السريري لمتلازمة تكيس المبايض. مع ذلك، لم يُلاحظ وجود ارتباط ذي دلالة إحصائية بين مؤشر كتلة الجسم والمعايير الهرمونية في المجموعة المدروسة.

**الكلمات المفتاحية**: متلازمة تكيس المبايضPCOS؛ FSH؛ LH ؛ نسبةLH/FSH ؛ التستوستيرون؛ البرولاكتين؛ مؤشر كتلة الجسم