The Egyptian Journal of Hospital Medicine (January 2023) Vol. 90, Page 1430-1433

A Comparative Study of Some Parameters Levels in Infertile Women

Hanan Khalid ALdhalimi[1*], Nawfal Hussien Aldujaili[2]
[1]Medical Laboratory Technology Department, College of Medical Technology,
The Islamic University, Najaf, IRAQ
[2]Departement of Biology, Faculty of Science, University of Kufa, Iraq
***Corresponding author:** Hanan Khalid ALdhalimi**, Mobile:** 009647810111300, **E-mail:** kaisalhadrawii@gmail.com

ABSTRACT

Background: There are millions of women and men around the world who currently have difficulty producing babies.
Objective: This study aimed to assess and evaluate the effectiveness of antioxidant enzymes and the level of some sex hormones, and their impact on infertility in women.
Patients and methods: One hundred twenty women with age range from 20 to 50 years old (90 infertility and 30 controls fertile) admitted at AL-Sadder Medical City, Al-Najaf Province during the period from January 2022 to June 2022. Sex hormones levels have been measured by using the Minivides technology and catalase enzyme using a spectrophotometer.
Results: Catalase in the 90 infertile women (11.87 ± 0.41 pg/ml) was decreased significantly than in the 30 control group (27.48 ± 1.362 pg/ml), while LH and prolactin were significantly increased in the infertile women compared to control group. The findings showed a positive correlation with significant differences between catalase and sex hormone, luteinizing hormone (LH), follicle-stimulating hormone (FSH), and prolactin, respectively.
Conclusion: Serum LH, and prolactin levels were significantly increased in infertile women, while catalase was significantly decreased in infertile women as compared to control group.
Key words: Infertility in women, Oxidative stress, Catalase enzyme, Sex hormone.

INTRODUCTION

The failure to get pregnant after a year of frequent, unprotected sexual activity is known as infertility [(1)].

Fertility is the ability to conceive and produce babies. Millions of individuals throughout the world currently experience infertility, and worries about it are growing, especially in less developed countries, where the majority of infertility diagnoses are made [(2)]. According to estimates, it occurs in 1 in 6 marriages, with men and women accounting for about equal numbers of instances. Nearly 15% of women globally have main or secondary infertility [(3)]. 37% of all infertile couples have female infertility [(4)].

The two types of infertility are primary and secondary. Its reported rates for primary infertility and single infertility vary from 0.6% to 3.4% and 8.7% to 32.6%, respectively [(5)].

The underlying factors are linked to contemporary living patterns or conditions characterized by elevated maternal aging, diabetes, obesity, stress, alcohol use, cigarette smoking, and exposure to contaminants, such as endocrine disruptors [(6)]. If the cellular antioxidant capacity is insufficient or ineffective to stop the increased production of reactive oxygen species that characterizes all of these circumstances, oxidative stress (OS) may result.

OS is hypothesized to contribute to infertility by interfering with vital elements of reproduction such spermatogenesis, folliculogenesis, fertilization, implantation, and placentation [(7)]. Oxidative stress occurs when the pro-oxidation and anti-oxidation mechanisms are out of equilibrium. Reactive oxygen species, which are essential for processes including ovarian steroidogenesis, oocyte maturation, folliculogenesis, ovulation, and luteolysis, play a significant role in female reproduction. The physiological levels of oxygen radicals created at ovulation in response to luteinizing hormone (LH) may serve as a signal for oocyte differentiation [(8)].

The function of natural antioxidants, also known as enzyme-based antioxidants, is to combat excessive reactive oxygen species and prevent it from damaging cellular structures. The enzymes that make up enzymatic antioxidants include superoxide dismutase, catalase, glutathione peroxidase, and glutathione reeducates. They also convert hydrogen peroxide to water and alcohol [(9)].

This study aimed to assess and evaluate the effectiveness of antioxidant enzymes and the level of some sex hormones, and their impact on infertility in women.

PATIENTS AND METHOD

Total women and hormones levels measurement:

One hundred twenty women with age ranged from 20 to 50 years old (90 infertility and 30 controls fertile) were admitted at AL-Sadder Medical City, Al-Najaf Province during the period from January 2022 to June 2022 [(10)].

Five ml of serum was placed in a gel tube, which was stored at -20 ^{o}C, and were used to measure the levels of the catalase enzyme and sex hormones in the blood. Sex hormones levels have been measured by using the Minivides technology (Marcy-rEoile-France) and catalase enzyme using a spectrophotometer [(11)].

Received: 7/8/2022
Accepted: 10/10/2022

Ethical approval:

An approval of this study was obtained from University of Kufa Academic and Ethical Committee. Informed consents from all patients were obtained. This work has been carried out in accordance with The Code of Ethics of the World women was 11.87 ± 0.41 pg/ml, which was decreased **Medical Association (Declaration of Helsinki) for studies involving humans.**

Statistical analysis

Data were collected and analysed using SPSS (Statistical Package for Social Sciences, version 20, IBM, and Armonk, New York). Quantitative data were expressed as mean ± standard deviation. Qualitative data were given as number (n) and percentage (%) [12, 13]. Correlations were determined by Spearman correlation. P-value < 0.05 was considered significant [14, 15].

RESULTS

Evaluation of Catalase in infertility women:

The present study observed that the concentration of catalase in 90 infertile significantly (P-value < 0.0001) as compared to the 30 control group (27.48 ± 1.362 pg/ml) as shown in figure (1).

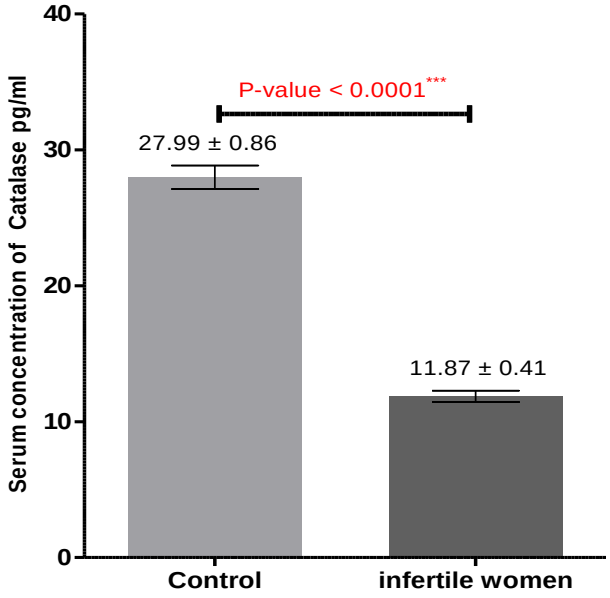

Figure (1): Catalase levels in infertile women and control group

Evaluation of LH in infertile women:

The present study also observed that the concentration of LH in 90 infertile women was 8.694 ± 0.2880 pg/ml, which was increased significantly (P-value < 0.0001) as compared to the 30 control group (3.911 ± 0.2935 pg/ml) as shown in figure (2).

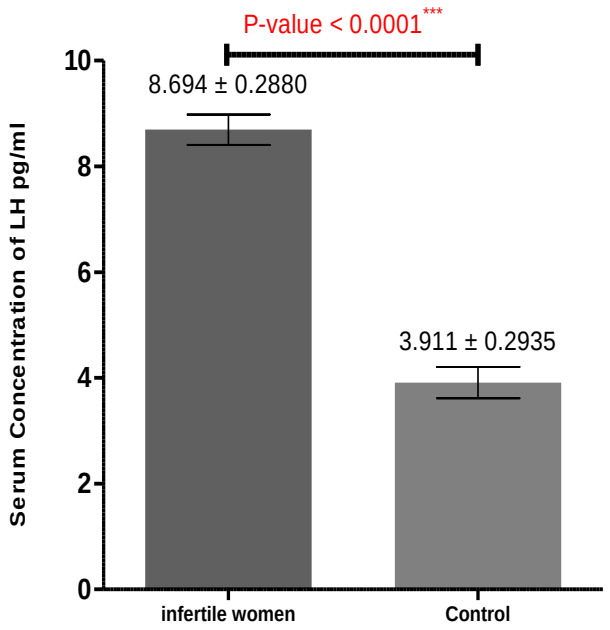

Figure (2): LH levels in infertile women and control group.

Evaluation of FSH in infertile women:

Non-significant difference was shown in figure (3) concerning FSH level between infertile women (6.793 ± 0.20 pg/ml) and control group (6.353±0.38 pg/ml).

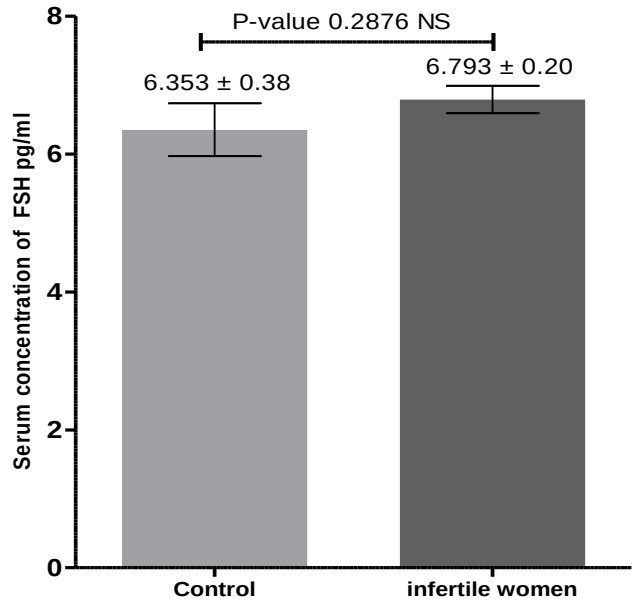

Figure (3): FSH levels in infertile women and control group.

Evaluation of prolactin in infertile women:

The present study showed that the concentration of prolactin in the 90 infertile women (42.62 ± 2.935 pg/ml) was increased significantly (P-value< 0.05) as compared to the control group (13.26 ± 0.7908 pg/ml) as shown in figure (4).

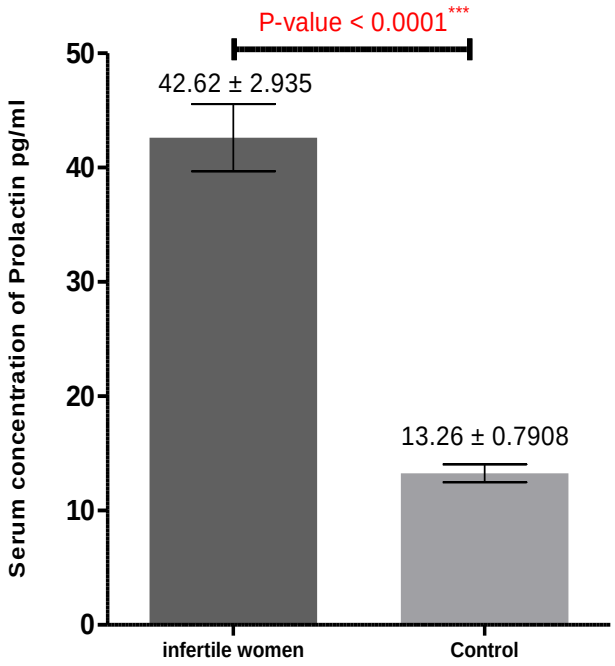

Figure (4): Prolactin levels in infertile women and control group.

DISCUSSION

The present study showed a gradual significant decrease (P-value< 0.05) in catalase serum levels of infertile women compared to healthy control. Infertility is caused by increased reactive oxygen species -induced lipid peroxidation damage and decreased antioxidant concentrations in women with idiopathic infertility, and these findings support the theory from The Cleveland Clinic Foundation's Center for Advanced Research in Human Reproduction, Infertility, and Sexual Function in the United States [(16)].

The statistical analysis showed a substantial difference in catalase serum levels of infertile women and control group, hence, there is a direct correlation between catalase enzyme serum levels in infertile women and in the control group. Because of earlier research, the current findings suggest that reduced catalase activity may contribute to infertility [(17)]. The fact that oxidative stress and antioxidants play a significant role in the regulation of female reproduction and that oxidative stress increased as the antioxidant defense system declined is evidence that antioxidants effectively prevent apoptosis. Furthermore, depletion of the reduced antioxidant enzymes causes apoptosis in many organs, including the corpus luteum, which prevents pregnancy [(18)].

Researchers in epidemiology, and biochemistry, as well as those studying in the clinical setting, have concluded that oxidative stress markers are involved in infertile women and progression [(19)].

The findings of the analysis aimed to assess the relationship of oxidative stress with antioxidants in infertility women. Overall, we found decreased levels of catalase in infertile women patients compared to healthy controls. A compromised antioxidant system may encourage the buildup of free radicals, leading to infertility in women. Alternately, the antioxidant system could be compromised as a result of abnormalities in the sex hormones that protect against oxidative stress [(20)].

In some studies, alterations of different antioxidant enzymes have been also proved to be associated with infertility in women, the oxidative stress theory of female infertility is supported by higher oxygen free radical generation and lower CAT activity [(21)].

CONCLUSION

Catalase, LH, FSH and prolactin serum levels in infertile women were significantly deference as compared to those of the fertile women. Serum LH, and prolactin levels were significantly increased in infertile women. While, catalase was significantly decreased in infertile women compared to control group.

Conflict of interest: None declared.
Funding: This research did not receive any specific grant from funding**.**

REFERENCE

1. **Al-Shukry A, Al-Hadrawi K, AL-Hadrawi M *et al.* (2022):** Assessment of Vitamin-D Levels Among Infertile Men in Iraq, A Comparative Study. The Egyptian Journal of Hospital Medicine, 89 (1): 4926-4929.
2. **Al-hadrawi K, ALGarawy R, Darweesh M (2022):** The Impact of IL-35, Bacterial Prostatitis in Development Male Infertility in Najaf Province Patients. The Egyptian Journal of Hospital Medicine, 89 (1): 4278-4283.
3. **Direkvand-Moghadam A, Sayehmiri K, Delpisheh A (2014):** The global trend of infertility: an original review and meta-analysis. International Journal of Epidemiologic Research, 1 (1): 35-43.
4. **Unuane D, Tournaye H, Velkeniers B *et al.* (2011):** Endocrine disorders & female infertility. Best Practice & Research Clinical Endocrinology & Metabolism, 25 (6): 861-873.
5. **Mascarenhas M , Flaxman S , Boerma T *et al.*(2012):** National, regional, and global trends in infertility prevalence since 1990: a systematic analysis of 277 health surveys. PLoS medicine, 9 (12): 1-12.
6. **Moreno I, Cicinelli E, Garcia-Grau I *et al.* (2018):** The diagnosis of chronic endometritis in infertile asymptomatic women: a comparative study of histology, microbial cultures, hysteroscopy, and molecular microbiology. American journal of obstetrics and gynecology, 218 (6): 602-e1.
7. **Wang L, Tang J, Wang L *et al.* (2021):** Oxidative stress in oocyte aging and female reproduction. Journal of Cellular Physiology, 236 (12): 7966-7983.
8. **Weng S, Tzeng S, Lee C *et al.* (2021):** Association between GnRH Receptor Polymorphisms and Luteinizing Hormone Levels for Low Ovarian Reserve Infertile Women. International journal of environmental research and public health, 18 (13): 1-11.

9. **Moawad A, Abou-Ria H, Abd Elzaher M *et al.* (2011):** Split ICSI/insemination in mild male factor infertility: A randomized controlled trial. The Egyptian Journal of Hospital Medicine, 43 (1): 121-33.
10. **Mohy A, Al-Hadraawy S, ALhadrawi K (2022):** Immunohistopathological Study for Patients with Appendicitis due to *Enterobius vermicularis* worm. The Egyptian Journal of Hospital Medicine, 88: 3576-3581.
11. **Sedrak A, Salem A, Amin T *et al.* (2022):** Cost effectiveness analysis of adopting Gene-Xpert®(GX) for the Diagnosis of Tuberculosis in Egypt. The Egyptian Journal of Hospital Medicine, 88 (1): 2452-8.
12. **Aljanaby A, Hasan T, Alasedi K (2021):** A comparative study of prevalence antimicrobials resistance klebsiella pneumoniae among different pathogenic bacteria isolated from patients with urinary tract infection in Al-Najaf City, Iraq. Latin American Journal of Pharmacy, 40 (Special Issue): 174-178.
13. **Adam R, Al-Labban H, Aljanaby A *et al.* (2019):** Synthesis, Characterization and Antibacterial Activity of Some Novel 1, 2, 3-Triazol-Chalcone Derivatives from N-Acetyl-5H-Dibenzo [b, f] Azepine-5-Carboxamide. Nano Biomed Eng., 11 (2): 99-110.
14. **Majeed H, Aljanaby A (2019):** Antibiotic susceptibility patterns and prevalence of some extended spectrum beta-lactamases genes in gram-negative bacteria isolated from patients infected with urinary tract infections in Al-Najaf City, Iraq. Avicenna journal of medical biotechnology, 11 (2): 192-201.
15. **Abd-Aljabar E, Aljanaby A (2021):** Role of macrophage migration inhibitory factor, cluster of differentiation 19 and interleukin 23 in individuals infected with *Salmonella typhi*. J Exp Biolo Agric Sci., 9 (3): 394-400.
16. **Adeoye O, Olawumi J, Opeyemi A *et al.* (2018):** Review on the role of glutathione on oxidative stress and infertility. JBRA assisted reproduction, 22 (1): 61-66.
17. **Bausenwein J, Serke H, Eberle K *et al.* (2009):** Elevated levels of oxidized low-density lipoprotein and of catalase activity in follicular fluid of obese women. MHR: Basic science of reproductive medicine, 16 (2): 117-124.
18. **Gaskins A, Chavarro J (2018):** Diet and fertility: a review. American journal of obstetrics and gynecology, 218 (4): 379-89.
19. **Hadi Z, Al-Maamori J (2020):** Evaluation some oxidants-Enzymatic endogenous antioxidants status among women patients with polycystic ovary syndrome. InAIP Conference Proceedings, 2290 (1): 1-12.
20. **Santos D, Fiais G, de Oliveira Passos A *et al.* (2022):** Effects of orchiectomy and testosterone replacement therapy on redox balance and salivary gland function in Wistar rats. The Journal of Steroid Biochemistry and Molecular Biology, 218 (106048): 1-8.
21. **Mendes S, Sá R, Magalhães M *et al.* (2022):** The Role of ROS as a Double-Edged Sword in (In) Fertility: The Impact of Cancer Treatment. Cancers, 14 (6): 1-20.