



## Investigation of Kisspeptin Hormone and Vitamin D<sub>3</sub> Levels in Infertile Men

Hasan Falah Zbalah<sup>1</sup>, Bushra Abbas Al-Zubaidi<sup>2</sup>

<sup>1</sup>Department of Biology, Faculty of Education For Girls, University of Kufa, Iraq

<sup>2</sup>Department of Biology, Faculty of Education For Girls, University of Kufa, Iraq



Corresponding Author: Hasan Falah Zbalah

### Résumé

The aim of this study is to detection levels of kisspeptin hormone and vitamin D<sub>3</sub> in oligozoospermia, asthenozoospermia and unexplained infertility in men.

This study included the examination of 200 samples after a period of abstinence of 3-5 days, where samples were collected from patients with oligozoospermia (50 samples), patients with asthenozoospermia (50 samples) and patients with unexplained infertility (50 samples) in comparison with control (50 samples) a control sample are between (21-45) years, in the laboratory of the Fertility Center / Al-Sadr Medical City / Najaf Governorate from 20/1/2021 to 1/1/2022.

The results also showed a significant decrease ( $p < 0.05$ ) in the concentration of kisspeptin hormone for oligozoospermia, asthenozoospermia and unexplained infertility compared to the control group.

Also the results showed a significant decrease ( $p < 0.05$ ) in the concentration of vitamin D<sub>3</sub> for oligozoospermia, asthenozoospermia, and unexplained infertility compared to the control group.

The results also showed a positive relationship between the kisspeptin hormone with vitamin D<sub>3</sub>, sperm concentration for oligozoospermia, asthenozoospermia and unexplained infertile.

The results also showed a positive relationship between vitamin D<sub>3</sub> with glutathione, sperm concentration, sperm motility and normal sperm Morphology for oligozoospermia, asthenozoospermia and unexplained infertile.

**Keywords:** kisspeptin hormone . vitamin D<sub>3</sub>, infertility

**Copyright:** © 2021 The Authors. Published by Medical Editor and Educational Research Publishers Ltd. This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by-nc-nd/4.0/>).

# Investigation of Kisspeptin Hormone and Vitamin D3 Levels in Infertile Men

## Introduction

Infertility is a global disease affecting one out of six couples of reproductive age in the world, with a male factor involved in half the cases. Kisspeptins from peptide families. possible implications in infertility etiopathogenesis. Many advances have been made to elucidate the roles of kisspeptins in infertility. All of this knowledge could lead to new advances in male infertility diagnosis and treatment, but further research is needed to clarify the role of kisspeptins in fertility (Blasco et al., 2020).

Kisspeptin neurons exist in close apposition with GnRH neurons in the hypothalamus of a range of species and GnRH neurons express the kisspeptin receptor. Kisspeptin stimulates GnRH neurons leading to GnRH release (Shahab et al., 2005).

Vitamin D receptor and enzymes that metabolize vitamin D are expressed in male reproductive organs. Effects of vitamin D signalling on semen quality, estrogen responsiveness and the development of testicular germ cell tumours. The spectrum of vitamin D target organs has expanded and the reproductive role of vitamin D is highlighted by expression of the vitamin D receptor (VDR) and enzymes that metabolize

vitamin D in testis, male reproductive tract and human spermatozoa. The expression levels of VDR in human spermatozoa serve as positive predictive markers of semen quality (Jensen, 2014). Vitamin D is also involved in the regulation of several hormones in the body all having to do with fertility (Arora et al., 2017).

## Materials and Methods

### Subjects

The practical part of the research was completed at laboratory of the Fertility Centers in AL-Saad Medical City in the Province of Najaf, AL-Najaf Health Directorate / Ministry of Health / Iraq during the period from 20/1/2021 to 1/1/2022. Semen and serum specimens were collected from Oligozoospermia, Asthenozoospermia, Unexplained infertility in infertile men and control group (Fertile Normozoospermia) that attended to fertility center. and collected semen fluid samples were for healthy people and infertile patients aged (21-45) years.

### Study Design

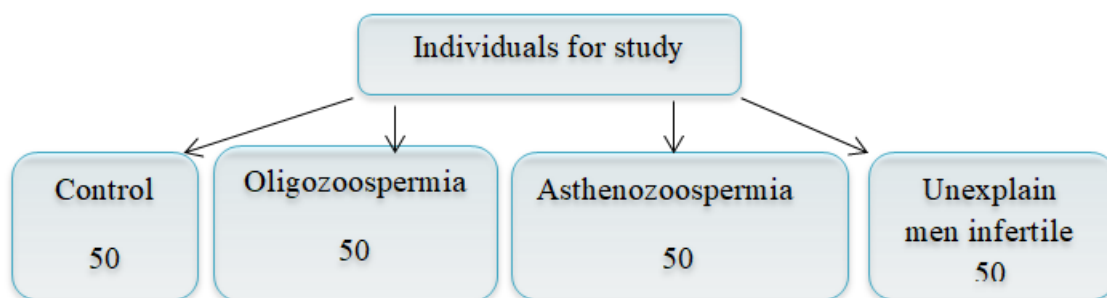


Figure 1 Schematic diagram of the study

### Semen collection and analysis

Semen specimens were collected from patients and control after 3 – 5 days of sexual abstinence directly in a dry, clean and sterile disposable container by masturbation in a quiet room adjacent to the laboratory of seminal fluid analysis.

The container was marked with the following information: patients' name, age, sexual abstinence of the sample collection.

The collected specimens were placed at 37°C for 30 minutes in an incubator to allow liquefaction.

The liquefied specimens were mixed carefully for a few seconds and then the specimens were examined under a microscope.

Analysis and classification of infertile patients were performed according to WHO (2010) utilized to estimate the results of seminal fluid analysis see appendix A.

## Investigation of Kisspeptin Hormone and Vitamin D3 Levels in Infertile Men

Where blood samples were collected for the purpose of Kisspeptin hormone examination.

### RESULTS

#### The Level of Kisspeptin hormone in infertile men

The results explained a significant decrease at the level of significance ( $p < 0.05$ ) at the level of the Kisspeptin hormone in the Oligozoospermia Asthenozoospermia and Unexplain men infertile Compared with the Control Group .However, there was no significant difference ( $p < 0.05$ ) between the groups of patients.

**Table 1 The Level of Kisspeptin hormone in infertile men**

Groups		Kisspeptin (ng/L)
		Mean±S.E
Control		201.91±14.345 <sup>a</sup>
Patient	Oligozoospermia	85.64±5.931 <sup>b</sup>
	Asthenozoospermia	73.36±8.422 <sup>b</sup>
	Unexplain men infertile	75.14±8.073 <sup>b</sup>

#### The Level of Vitamin D<sub>3</sub> in infertile men

The found a highly significant decrease ( $p < 0.05$ ) at the level of Vitamin D<sub>3</sub> between Patients and Control Group .

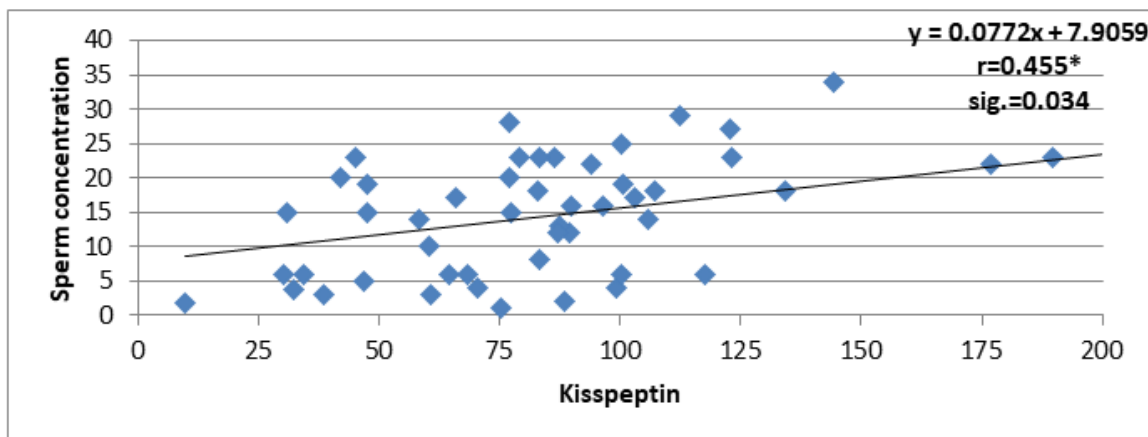
Also there significant decrease ( $p < 0.05$ ) in Asthenozoospermia and Unexplain infertility, and no significant difference ( $p < 0.05$ ) between Oligozoospermia and Unexplain infertility.

**Table 2 The Level of Vitamin D3 in infertile men**

Groups		Vitamin D <sub>3</sub> (ng/ml)
		Mean±S.E
Control		72.23±2.98 <sup>a</sup>
Patient	Oligozoospermia	30.41±7.60 <sup>b</sup>
	Asthenozoospermia	16.04±0.81 <sup>c</sup>
	Unexplain men infertile	34.99±3.23 <sup>b</sup>

#### The correlation between Kisspeptin hormone with Sperm concentration in infertile men

The study showed the presence of a positive correlation between Kisspeptin hormone with Sperm concentration.



**Figure 2 The correlation between Kisspeptin hormone with sperm concentration in the Oligozoospermia infertile men**

## Investigation of Kisspeptin Hormone and Vitamin D3 Levels in Infertile Men

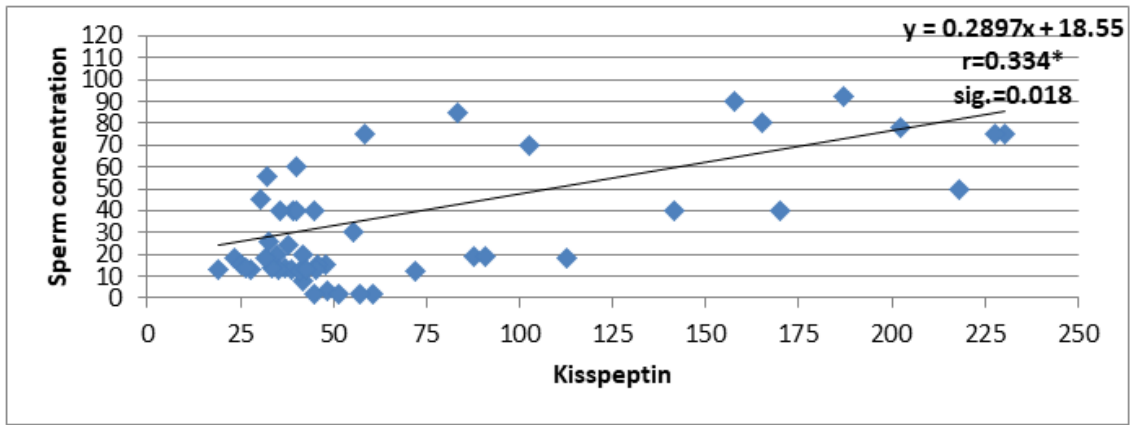


Figure 3 The correlation between Kisspeptin hormone with sperm concentration in the Asthenozoospermia infertile men

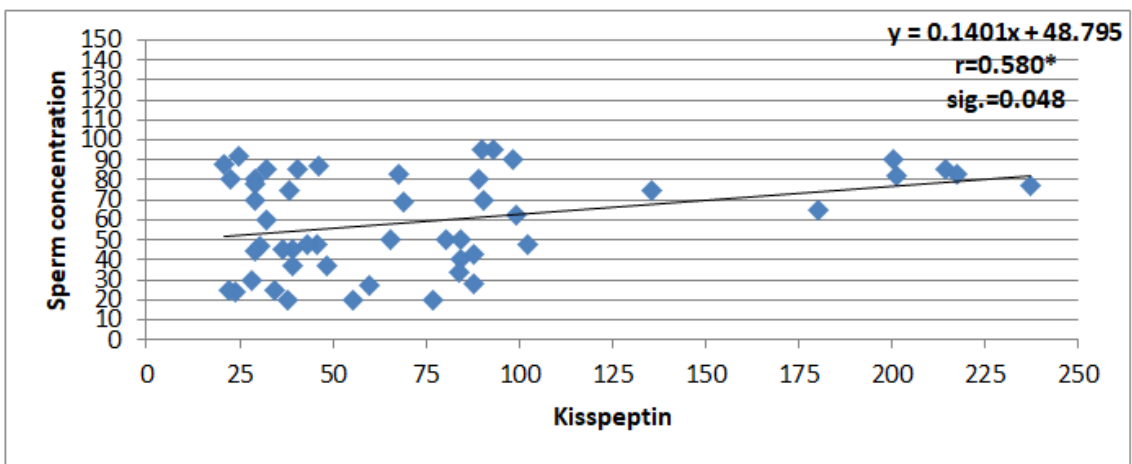


Figure 4 The correlation between Kisspeptin hormone with sperm concentration in the Unexplained infertile men

### 4.3.7 The correlation between Vitamin D<sub>3</sub> with Sperm concentration in infertile men

The study showed the presence of a positive correlation between Vitamin D<sub>3</sub> with Sperm concentration.

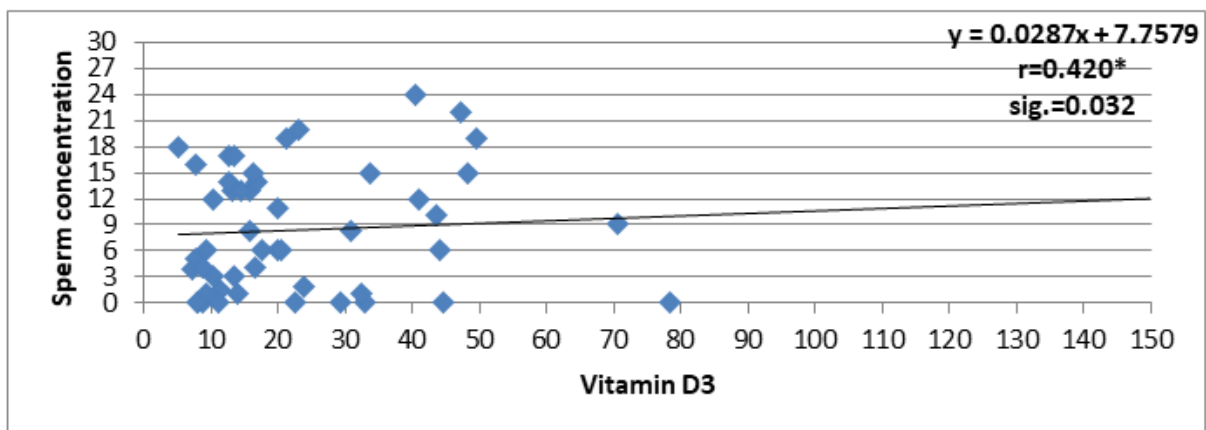
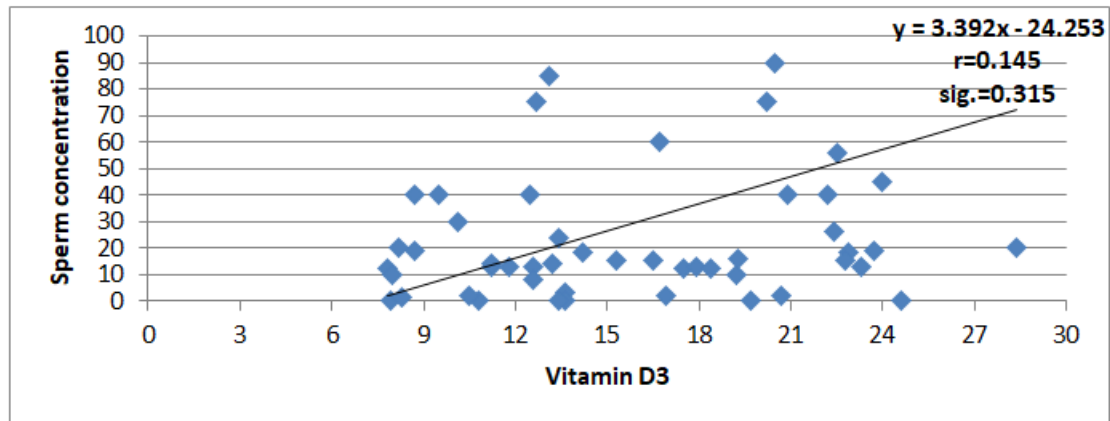
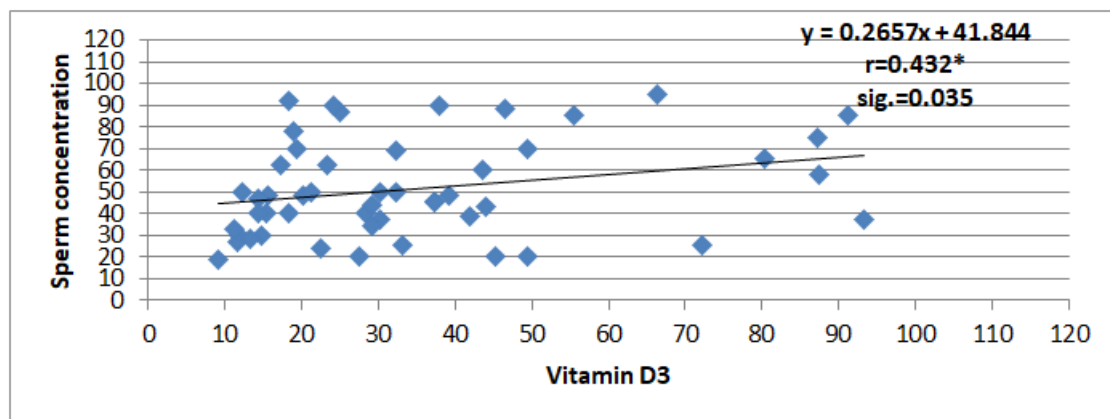


Figure 5 The correlation between Vitamin D<sub>3</sub> with sperm concentration in the Oligozoospermia infertile men

## Investigation of Kisspeptin Hormone and Vitamin D3 Levels in Infertile Men



**Figure 6** The correlation between Vitamin D<sub>3</sub> with sperm concentration in the Asthenozoospermia infertile men



**Figure 7** The correlation between Vitamin D<sub>3</sub> with sperm concentration in the Unexplained infertile men

### Discussion

The present study showed a significant decrease ( $p < 0.05$ ) of Kisspeptin hormone in the Oligozoospermia, Asthenozoospermia and Unexplain men infertile Compared with the Control Group.

The results also showed a positive relationship between the kisspeptin hormone with sperm concentration for oligozoospermia, asthenozoospermia and unexplained infertility.

The results of the current study are in agreement with Kocaman and Ayas (2021) it is suggested that kisspeptin protein in seminal plasma is positively associated with semen quality. Also the results of the current study are agreement with (Sharma et al., 2020).

Through the results of the current study, it may be related to male fertility, as there are many studies that suggests kisspeptin associated with male

fertility Moreover kisspeptin had a stronger correlation with sperm concentration (Yu et al., 2019 Abbara et al., 2020).

The results of the current study showed that kisspeptin may be one of causes the unexplained infertility. A study confirmed that kisspeptin responsible for alteration in release of reproductive hormones and gonadal functions. Therefore, he is related to infertility (Rehman et al., 2019) ; (Hameed et al., 2011).

The present study showed a significant decrease ( $p < 0.05$ ) of Vitamin D<sub>3</sub> in the Oligozoospermia, Asthenozoospermia and Unexplain men infertile Compared with the Control Group.

The results also showed a positive relationship between vitamin D<sub>3</sub> with sperm concentration for oligozoospermia, asthenozoospermia and unexplained infertility.

## Investigation of Kisspeptin Hormone and Vitamin D3 Levels in Infertile Men

The study by Ali et al., (2020) agreed with the results of the current study, which showed the Vitamin D increases sperm motility and also impacts on the ability of sperm to undergo the acrosome reaction and consequently the ability to fertilize.

The study was showed Vitamin D is mandatory for normal reproductive functions (Bhatti et al., 2019).

The results of the current study are in agreement with study that Vitamin D positively correlated with semen volume and sperm kinetic values (Kjzd.et al.,2019).

The results of the current study agreed with study by Turan (2018) which showed vitamin D deficiency can lead to infertility in man. In males it has been suggested to affect sperm count and morphology. Even in studies in vitro fertilization has been shown to increase the success rate with the support of vitamin D. The study by Albaldawy and Alsalami (2017) showed a significant decrease of VD level in both Teratozoospermia and infertile normospermia compared with control group.

### References

1. Abbara et al., Kyung-Eun Lee 1, Sang Hyun Moh 3, Hyeonju Yeo 1,\*, Sugyeong Jeong 1,, Seok Kyun Yun 1, Seoyeon Kyung 1, Abadie Sophie 2 , Hyo Hyun Seo 3, Myeong Sam Park 1, Seunghyun Kang 1( 2020). Synthesis of Kisspeptin-Mimicking Fragments and Investigation of their Skin Anti-Aging .
2. Albaldawy, M. T., & Alsalami, A. S. (2017). Study of association among vitamin D, testosterone and semen quality in fertile and Iraqi infertile men. *Journal of Pharmaceutical Sciences and Research*, 9(7), 1067–1071.
3. Ali, S. A. A., Zainab, A. R. A. S., & Hussain, K. A. D. (2020). Impact of Vitamin D on Male Iraqi Patients with Infertility. *Annals of Tropical Medicine and Public Health*, 23(20). <https://doi.org/10.36295/ASRO.2020.232240>.
4. Arora, M., Saini, V., & Jain, D. (2017). Vitamin D deficiency in Infertility cases , a pilot study in Delhi. June, 130–135.
5. Bhatti, Z. I., Choudhery, K. A., Yasin, I., Assan, M. H., & Bashir, F. (2019). Role of Vitamin D supplements in improving fertility among sub fertile couples. *Pakistan Journal of Medical and Health Sciences*, 13(1), 28–32.
6. Blasco, V., Pinto, F. M., González-Ravina, C., Santamaría-López, E., Candenas, L., & Fernández-Sánchez, M. (2020). Tachykinins and kisspeptins in the regulation of human male fertility. *Journal of Clinical Medicine*, 9(1). <https://doi.org/10.3390/jcm9010113>.
7. Hameed, S., Jayasena, C. N., & Dhillo, W. S. (2011). Kisspeptin and fertility. *Journal of Endocrinology*, 208(2), 97–105. <https://doi.org/10.1677/JOE-10-0265>.
8. Jensen, M. B. (2014). Vitamin D and male reproduction. *Nature Reviews Endocrinology* 2014 10:3, 10(3), 175–186. <https://doi.org/10.1038/nrendo.2013.262>.
9. Kjzd, D.-Dwll.-P., Pjil, C. and B.L.Y. (2019). The effect of Vitamin D on sperm motility and the underlying mechanism. In *Asian Journal of Andrology* (Vol. 21, Issue 4, pp. 400–407). [http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L628454963%0Ahttp://dx.doi.org/10.4103/aja.aja\\_105\\_18](http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L628454963%0Ahttp://dx.doi.org/10.4103/aja.aja_105_18).
10. Kocaman, A., & Ayas, B. (2021). O-152 Investigation of the relationship of sperm motility and Kisspeptin in subfertile men. In *Human Reproduction* (Vol. 36, Issue Supplement\_1). <https://doi.org/10.1093/humrep/deab127.020>.
11. Rehman, R., Fatima, S. S., Alam, F., Ashraf, M., & Zafar, S. (2019). Kisspeptin and attributes of infertile males and females: A cross-sectional study in a subset of Pakistani population. *Andrologia*, 51(9), e13370. <https://doi.org/10.1111/AND.13370>
12. Shahab M, Mastronardi C, Seminara SB, Crowley WF, Ojeda SR, (2005). Plant TM. Increased hypothalamic GPR54 signaling: a potential mechanism for initiation of puberty in primates. *Proc Natl Acad Sci U S A*;102 :2129-34.
13. Sharma, Aditi, Thaventhiran, T., Minhas, S.,

## Investigation of Kisspeptin Hormone and Vitamin D3 Levels in Infertile Men

- Dhillon, W. S., & Jayasena, C. N. (2020). Kisspeptin and testicular function—is it necessary? *International Journal of Molecular Sciences*, 21(8), 1–14. <https://doi.org/10.3390/ijms21082958>.
14. Turan, O. D. (2018). Vitamin D Level and Infertility. *Meandros Medical and Dental Journal*, 19(2), 106–110. <https://doi.org/10.4274/meandros.2399>.
15. Yu, H., Liu, J., Han, Y., Chen, C., & Meng, F. (2019). Correlation between serum kisspeptin and spermatogenic function in men. *BioRxiv*. <https://doi.org/10.1101/810572>.

**Cite this: Zbalah, H. F., & Al-Zubaidi, B. A. (2023). Investigation of Kisspeptin Hormone and Vitamin D3 Levels in Infertile Men. *Journal of Medical Research and Health Sciences*, 6(11), 2834–2840. <https://doi.org/10.52845/JMRHS/2023-6-11-3>**