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Investigation of kisspeptin hormone and vitamin D3 levels in infertile men

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Abstract--The aim of this study is to detection levels of kisspeptin hormone and vitamin D₃ 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 D₃ for oligozoospermia, asthenozoospermia, and unexplained infertility compared to the control group. The results also showed a positive relationship between the kisspeptin hormone with vitamin D₃, sperm concentration for oligozoospermia, asthenozoospermia and unexplained infertile. The results also showed a positive relationship between vitamin D₃ with glutathione, sperm concentration, sperm motility and normal sperm Morphology for oligozoospermia, asthenozoospermia and unexplained infertile.

Keywords--kisspeptin hormone, vitamin D₃, infertility.

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 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 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-Saadr 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 of semen fluid samples were for healthy people and infertile patients aged (21-45) years.

Study design

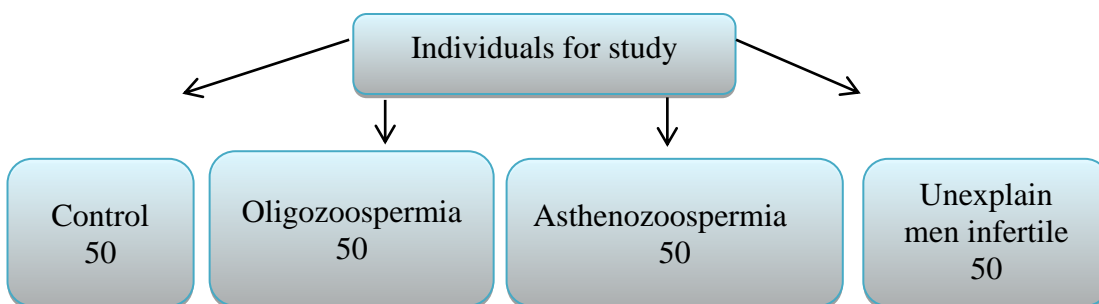


Figure 1. Schematic diagram of the study

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 37C 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. 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 ^a
Patient	Oligozoospermia	85.64±5.931 ^b
	Asthenozoospermia	73.36±8.422 ^b
	Unexplain men infertile	75.14±8.073 ^b

The Level of Vitamin D₃ in infertile men

The found a highly significant decrease ($p < 0.05$) at the level of Vitamin D₃ 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 ₃ (ng/ml)
		Mean±S.E
Control		72.23±2.98 ^a
Patient	Oligozoospermia	30.41±7.60 ^b
	Asthenozoospermia	16.04±0.81 ^c
	Unexplain men infertile	34.99±3.23 ^b

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.

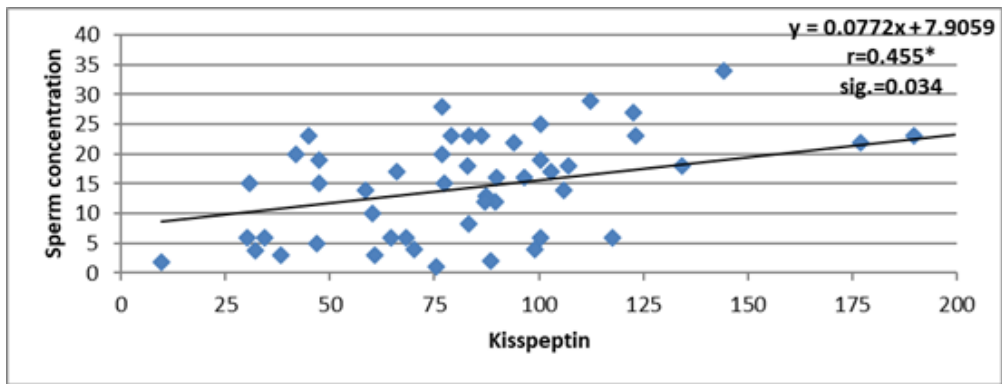


Figure 2 The correlation between Kisspeptin hormone with sperm concentration in the Oligozoospermia infertile men

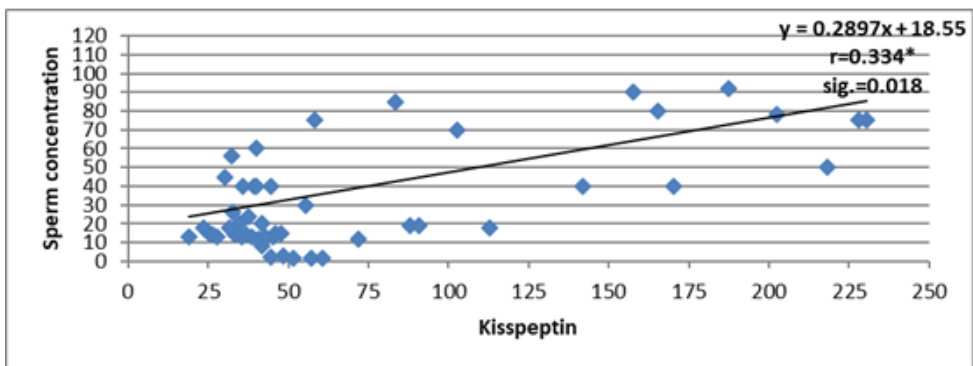


Figure 3 The correlation between Kisspeptin hormone with sperm concentration in the Asthenozoospermia infertile men

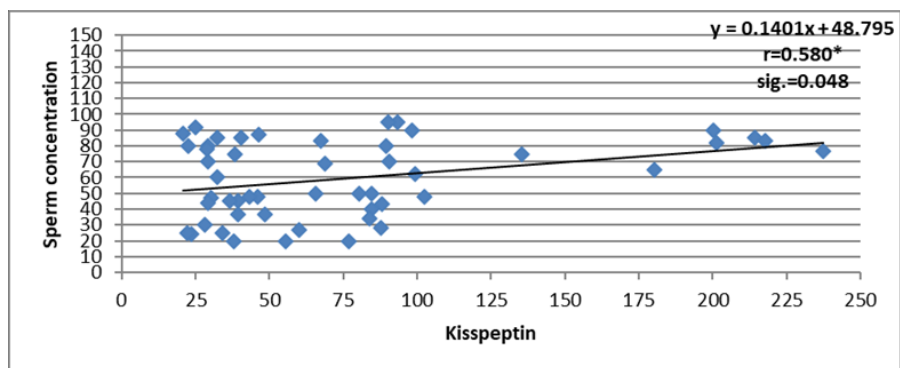


Figure 4. The correlation between Kisspeptin hormone with sperm concentration in the Unexplained infertile men

The correlation between Vitamin D₃ with Sperm concentration in infertile men

The study showed the presence of a positive correlation between Vitamin D₃ with Sperm concentration.

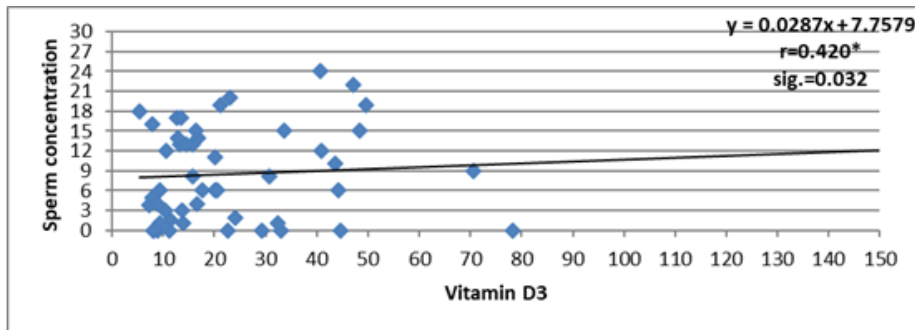


Figure 5 The correlation between Vitamin D₃ with sperm concentration in the Oligozoospermia infertile men

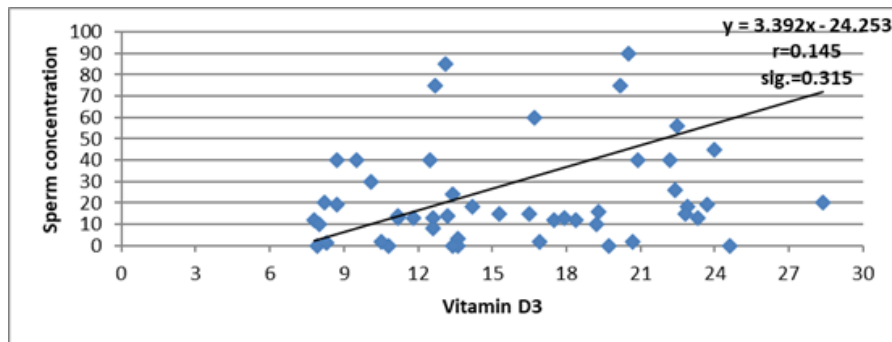


Figure 6 The correlation between Vitamin D₃ with sperm concentration in the Asthenozoospermia infertile men

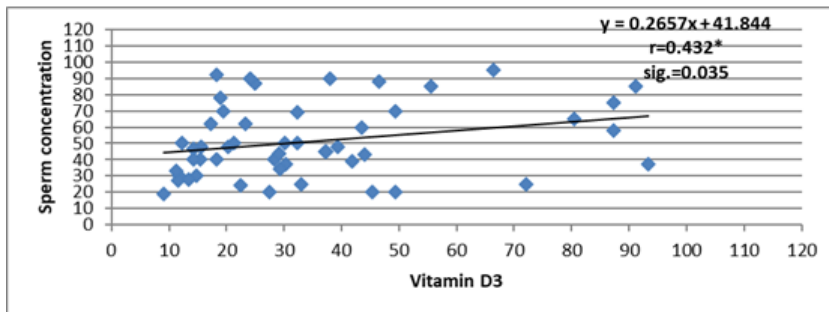


Figure 7 The correlation between Vitamin D₃ with sperm concentration in the Unexplained infertile men

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 D₃ in the Oligozoospermia, Asthenozoospermia and Unexplain men infertile Compared with the Control Group. The results also showed a positive relationship between vitamin D₃ with sperm concentration for oligozoospermia, asthenozoospermia and unexplained infertility. 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.

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