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Study of the Correlation of Vitamin D and Testosterone with Infertility Men in the AL Najaf Province, Iraq

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Abstract

The study of infertility is regarded as one of the obstacles to sustainable development. Infertility is defined as the inability to conceive after a reasonable period of sexual activity without the use of contraceptives. It affects 1/5 to 1/6 of couples who are of reproductive age, but it poses no threat to the person's life or physical integrity. However, can have a bad effect on a person's development and damage their personality. The study sought to investigate the relationship between men's infertility and vitamin D levels and testosterone since infertility affects both men and women, and each of them has specific reasons. Using VIDAS Technology (a French business), the concentrations of vitamin D and testosterone were determined for 60 infertile males. According to the study, testosterone and vitamin D levels in infertile males are lower (13.3 pg/ml and 1.68 ng/ml, respectively) than in the control group (41.27 pg/ml and 6.62 ng/ml, respectively). The findings had a substantial statistical impact ($P < 0.001$). Software called (SPSS) program, version 2023, was used to examine the data. Men's infertility has a variety of reasons, and this study's findings indicated that low levels of vitamin D and testosterone are two of them. It is thus advised to check both of these levels when later childbearing is being handled.

Keywords: Vitamin D, Testosterone, Infertility, Men, Najaf

Introduction

According to the World Health Organization (WHO) [1], infertility is "the inability of a sexually active, non-contracepting couple to achieve spontaneous pregnancy in one year." Many couples are unable to conceive, including those who require infertility treatment to end a year of childless marriage (15%), some who are unable to conceive (6%) [2], and 3% of women who remain childless, with 50% of childlessness being caused by abnormalities in male semen parameters. Along with immunological factors, genetic anomalies, and endocrine issues, malignant neoplasms also affect male fertility [3].

According to studies, 186 million individuals worldwide- including 48 million couples—suffer from infertility, and 30% of instances are brought on by male-related issues [4, 5].

In order to choose the men who can be treated and develop the ideal treatment plan, it is crucial to identify any potential causes of infertility. Despite testosterone being a substantial regulator of the quantitative natural sperm production, FSH remains the primary hormone for spermatogenesis. Testosterone replenishment from outside the body will defeat spermatogenesis. Treatment for men who lack symptomatic testosterone is challenging and lacks evidence-based advice. Exogenous testosterone is combined with transdermal, oral, or intramuscular physiological preparations to continue the process of substitution [6].

According to the WHO's recommendation, sperm testing is the sole method used to evaluate male infertility. If the husband's infertility causes are unclear and the causes of sperm malfunction are unknown, they are frequently directly displayed for fertilization laboratories, which prevents more pertinent, less hazardous therapies [7]. The pleiotropic chemical vitamin D has sparked study on its impact on non-traditional target tissues and organs, as well as metabolism and bones [8, 9] vitamin D receptors' various locations in people. Spermatozoa aid Vitamin D's potential effects on sperm activities [10, 11].

The idea that vitamin D may have a role in male sexual function is further supported by the fact that the vitamin D receptor is determined in spermatogonia, Leydig, and germ cells [12].

The expression of vitamin D metabolizing and vitamin D receptor enzymes was demonstrated in the spermatozoa and testis, indicating the fundamental involvement of vitamin D in the male genital system at this time. In humans, a decline in vitamin D has a passive impact on semen production and hormone production [13]. Therefore, there is still debate on the role of vitamin D in male infertility. One study found that although an increasing vitamin D level was surprisingly connected with a lower crude median outright count of sperm and a lower percentage morphology of simple sperm, it had no harmful effects on the quality of semen in the group of healthy men. Modulation produces unimportant linkages in the findings [14].

Due to its active involvement in the body, particularly for the autocrine and paracrine activities of the endocrine glands, research have recently tended to focus on the vitamin D topic. The vitamin D molecule is a member of the sec steroids family and is important for maintaining calcium and phosphorus balance in the body. It also affects every organ, including the skeletal system, parathyroid gland, kidneys, intestines, and kidneys [13].

The gut, parathyroid glands, and kidneys are the three most significant organs that vitamin D targets in the body. As a result, vitamin D has biological impacts on these organs.The pancreas, thyroid, cardiovascular system, and reproductive system are among the target organs of current programs that concentrate on the function of vitamin D [15, 16, 17], hence this publication sought to understand the relationship between male infertility and the levels of testosterone and vitamin D.

Materials and Methods

In the current study, 30 healthy males were compared to 60 infertile patients who visited the infertility unit at Al-Sadr Hospital between January and April 2022. The VIDAS approach was used to determine the vitamin D concentration and testosterone level in the patients' sera following a clinical evaluation by the expert doctor. Similar products made by the French firm r-Eloile [18]. The findings were analyzed with the use of the SPSS program, version 2023, by computing the mean, standard deviation, and A NOVA test; the results were considered significant at $p < 0.05$ [19].

Results

The study involved 60 infertile men compared with 30 fertile Men. These results showed a significant reduction ($p < 0.001$) in the concentration scale of vitamin D in men of infertility contrasted with the healthy group (13.3, 41.27) pg./ml respectively (Fig 1).

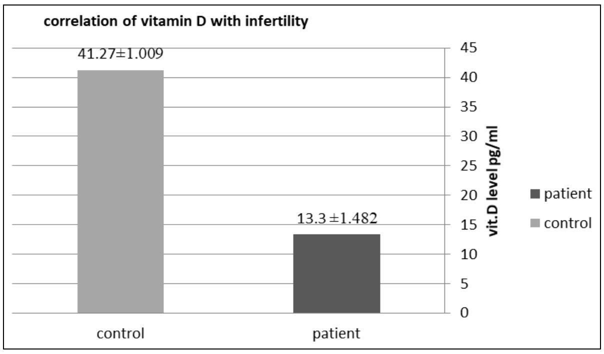

Fig 1: Show the relationship between levels of vitamin D in infertile Men compared with healthy Men

Also, the study explained the effect of Testosterone on fertility where the current results explained a significant decrease ($p < 0.001$) in levels of Testosterone in patients Men compared with the control group (1.68, 6.62) ng/ml respectively (Fig 2).

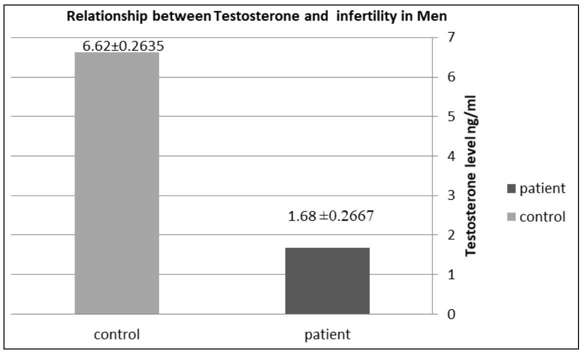

Fig 2: Show the relationship between levels of Testosterone with infertile Men compared with healthy Men

Discussion

A current debate over the lack of vitamin D in the world's population has prompted in-depth investigations into its function in non-classical target tissues and organs, without metabolism and bone health, and male reproductive organs are among its targeted tissues [20, 21, 22].

Due to vitamin D's strong association with sperm motility, which did researchers [23] discover in addition to the study [8] that demonstrated the beneficial effect; the current study demonstrated the strong link between vitamin D and infertility in males. The equation states that an increase in vitamin D of one unit (ng ml-1) is linked to a 2.1% increase in motile spermatozoa in the expelled semen.

In male genital tract epithelial cells, Sertoli cells, spermatozoa, Leyding cells, and germ cells, vitamin D enzymes are simultaneously metabolized. This shows that the genital organs may alter the way that vitamin D reacts in human beings. It appears that the testicular cells may create and deplete vitamin D locally, independent of the metabolism of systemic vitamin D. Additionally, research suggests that vitamin D may have a paracrine or autocrine effect and may be crucial for the function of the testis, affecting male fertility [7], In addition, Mary [24] discovered that regardless of other factors, the blood vitamin D3 content was favorably correlated with the quantity and quality of sperm as well as true morphology.

Vit.D3 mechanisms and its receptor serve as an orientation compass for maintaining Vit.D3 concentration higher than 30 ng ml1 for a better genital act in men. Some studies have stated a positive relationship with the morphology and motility of sperm, but others have shown a negative relationship. If increased Vit.D3 concentration may create more sperm and testosterone with greater fineness [25, 13].

Additionally, the study's findings demonstrated that infertile men had lower testosterone levels than the control group, which affects many men and is frequently accompanied with unwelcome symptoms. In order to treat males whose lack of testosterone frequently results in poor spermatogenesis; exogenous testosterone therapy is employed in clinical practice. Moreover, reduced the generation of endogenous testosterone. Men who volunteer to have their fertility assessed in Canada do not use testosterone (1.3%). After receiving testosterone therapy for 6 months, 2/3 of infertile men were able to resume sperm production [26].

The American Urological Association issued guidelines for the diagnosis and care of males with low testosterone in 2018. The use of "alternative therapies" was advised for men with low testosterone who wanted to preserve their future fertility. The outcome of these therapies is a recovery of endogenous testosterone synthesis, which then aids in spermatogenesis [27]. It is advised to use exogenous testosterone in order to address a low level of testosterone.

Conclusion

Men can become infertile for a variety of causes, some of which are well known and others which are still being investigated. As a result of this study's confirmation that low levels of testosterone and vitamin D are contributing factors in male infertility, it is advised to check these substances' levels if childbirth is postponed without the use of contraceptives.

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Conflict of Interest

The researchers declare no conflict of interest.

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