International Journal of Advances in Medicine
Samreen et al. Int J Adv Med. 2024 Jul;11(4):411-414
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: https://dx.doi.org/10.18203/2349-3933.ijam20241639

Review Article

Hypovitaminosis-D and sexual dysfunction

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Received: 04 May 2024
Accepted: 03 June 2024

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ABSTRACT

Sex has a significant impact on a person's quality of life. Numerous elements, including endocrine, vascular, psychological, and neurological ones, have an impact on sexual function. Male and female sexual dysfunction is a prevalent issue in both sexes. About 30% of males and 40% of women are reported to have sexual dysfunction. The main factors influencing sexual responsiveness are neurological and endocrine activity. An increased risk of obstetric and gynecologic issues, including endometriosis, polycystic ovaries, infertility, gestational diabetes, preeclampsia, and ovarian and breast cancer, is also linked to vitamin-D insufficiency. Data from several studies conducted worldwide indicate that vitamin D is vital for both male and female sexual function.

Keywords: Hypovitaminosis-D, Erectile dysfunction, Arousal disorder, Sexual disorder

INTRODUCTION

Sex has a significant impact on a person's quality of life. Numerous elements, including endocrine, vascular, psychological, and neurological ones, have an impact on sexual function.[1] Sexual dysfunction is a prevalent issue that affects individuals of both sexes. About 30% of males and 40% of women are reported to have sexual dysfunction.[2,3] Men and women are affected by sexual dysfunction differently. It encompasses low libido, early ejaculation, and erectile dysfunction in men.[4] It includes arousal disorders, orgasmic disorders, and penetration disorders in women.[5] These sexual disorders affect a person's general personality in terms of relationships, life pleasure, and self-worth. A significant factor in infertility issues, marital conflicts, and divorce is also sexual dysfunction. The main factors influencing sexual responsiveness are neurological and endocrine activity.[6] The body's physiological processes and calcium homeostasis are significantly impacted by vitamin D. Vitamin D has a number of non-calcium dependent effects on the body because of receptor distribution. Numerous research has been conducted on vitamin D insufficiency and its effects on cardiovascular disease, multiple sclerosis and other neurological illnesses, depression, and metabolic syndrome.[7,8] reports of vitamin-D receptors in female reproductive organs such as the uterus and ovaries. An increased risk of obstetric and gynecologic issues, including endometriosis, polycystic ovaries, infertility, gestational diabetes, preeclampsia, and ovarian and breast cancer, is also linked to vitamin-D insufficiency.[9] Additionally, a small number of studies have demonstrated that vitamin D decreases vaginal dryness and has a role in the regulation of vaginal epithelial growth and differentiation as well as the prevention of vaginal atrophy.[10] A shortage in vitamin D can also result in a drop in blood testosterone levels, which is important for male sexual dysfunction, particularly erectile dysfunction.[11] A widespread health issue, vitamin-D insufficiency affects 60-80% of people in India. Several investigations were conducted to look into the impact of vitamin D supplementation on sexual function. According to one of these research, middle-aged men's erectile function was enhanced by vitamin D intake, which was linked to higher serum testosterone levels and beneficial effects on the metabolic syndrome components.[12]

PREVIOUS STUDIES ON MEN SEXUAL FUNCTION

In a 2019 study, Ahn et al from Korea examined the potential benefits of zinc and vitamin D supplementation for senior erectile dysfunction patients. There were 28 patients in this single-arm pilot research, with ages ranging from 54 to 84. At baseline, the patient's medical history and a battery of laboratory tests were taken, including a lipid profile, HbA1c, serum testosterone, and serum vitamin D (25(OH) D). For 12 weeks, all patients received zinc 12 mg/day and vitamin D3 1,000 IU/day. They were also requested to complete the IIEF-5 questionnaire at baseline and 12 weeks after treatment. Nineteen patients (67.9%) had vitamin D deficiency (<20 ng/ml), with a mean level of 11.2±3.9 ng/ml. There were no significant differences in mean age, BMI, lipid profile, HbA1c, or serum testosterone between males with and without VD insufficiency. Men with VD insufficiency showed a substantial rise in IIEF score (from 11.2±4.9 to 14.2±5.8, p<0.01), but men without VD deficiency showed no significant increase (from 9.3±6.4 to 8.3±4.6, p<0.526). This study demonstrated that in older men with VD deficit, supplementing with zinc and VD enhances erectile function. To determine the potential functions of vitamin D and vitamin-D treatment in ED patients, large-scale, randomized, placebo-controlled interventional trials are required.

According to a 2019 study by Culha et al from Turkey, 42 patients who were taking tadalafil 5 mg as a phosphodiesterase-5 inhibitor to treat erectile dysfunction did not see any benefits from the medication. For one month, patients with serum vitamin D levels less than 20 ng/ml were given an oral vitamin D3 supplement (100,000 IU/week). Over the course of this month, individuals kept taking 5 mg of tadalafil every day. Scores from the international prostate symptom score (IPSS) and the international erectile function index-erectile function (IIEF-EF) were compared before and after vitamin D use. The study excluded patients with low testosterone, neurogenic illness, hypertension, and type 2 diabetes mellitus. IIEF-EF, with p<0.001, pre-treatment: 11.02±5.50 and post-treatment: 23.00±4.96 and IPSS (pretreatment: 7.81±5.67, post-treatment: 3.43±1.13; p=0.003) scores were significantly improved.[14]

A study by Pandey et al from India, published in 2021, found that 75 patients with erectile dysfunction were deficient in vitamin D. Three arms were created for the patients. The 12-week intervention ran. Arm A received 10 mg of tadalafil once daily in addition to 60,000 IU of vitamin D once a week. One weekly dose of 60,000 IU of vitamin D was administered to Arm B. Subjects in Arm C were administered 10 mg of Tadalafil once day. Following a 12-week course of therapy, Arm C patients' IIEF-5 scores were almost identical to baseline levels, showing no discernible variation. Nonetheless, patients in groups A and B showed a significant improvement in IIEF-5 scoring (p<0.05).[15]

PREVIOUS STUDIES ON WOMEN SEXUAL FUNCTION

A randomized, double-blind, placebo-controlled trial with 76 women, 38 case group, and 38 control group was published by Jalali-Chimeh et al from Iran. The trial lasted 8 weeks and had an average 25-OH vitamin-D level of 14.4±3.2 ng/ml. The case group received an intramuscular injection of 300,000 IU of cholecalciferol, while the control group received a placebo. The female sexual function index (FSFI) was employed four and eight weeks following the intervention, as well as at baseline. At 4 and 8 weeks following the intervention, the female sexual function index scores in the intervention group were considerably higher (p=0.002 and p<0.001, respectively).[16]

A study by Krysiak et al examined the effects of vitamin D supplementation on depression symptoms and sexual function in young women with low vitamin D levels.[17] Three groups participated in this study: In the first group, 16 women with a serum vitamin D deficiency (serum vitamin D level <20 ng/ml) received a daily dose of 400,000 units of vitamin D supplementation; in the second group, 17 women with a serum vitamin D level between 20 and 30 ng/ml received a daily dose of 400,000 units of vitamin D supplementation; and in the third group, 14 women with a serum vitamin D deficiency who did not receive any supplementation.

The female sexual performance index (FSFI) was employed both at baseline and six months later to measure women's sexual function in an objective manner. The three domains of libido, orgasm, and sexual pleasure scores on the FSFI were lower in women with vitamin D insufficiency than in those with insufficient amounts of the vitamin. In women who were vitamin D deficient, vitamin D supplementation enhanced orgasm, sexual satisfaction, and total FSFI score (p<0.05), as well as libido in both intervention groups.[17]

In a 2015 study, Rad et al examined the impact of vitamin D on vaginal atrophy in postmenopausal women, utilizing 44 individuals who had undergone menopause for a minimum of one year. In this trial, for eight weeks-every night for the first two weeks, then every other night for the next six weeks-1000 units of vitamin-D were given to the vaginal suppository intervention group and a placebo to the control group. The degree of pain experienced during sexual activity prior to the intervention, as well as at the conclusion of the 2, 4, and 8-week period following the intervention, was measured using the visual analog scale (VAS). In this study, the intervention group's mean pain score during sexual activity was considerably lower than the placebo group (p=0.001).[18]

DISCUSSION

This article sought to ascertain how vitamin D affects sexual function. Research has indicated that

supplementing with vitamin D can enhance sexual function in both genders. The impact of vitamin D on erectile function was investigated in three research (Canguven et al, Ahn et al and Culha et al).[12-14] The findings of these studies indicated that vitamin-D supplementation enhanced the international index of erectile function. Endothelial dysfunction is a significant biological risk factor for erectile dysfunction because it reduces vasodilation, damages the artery wall with atherosclerotic lesions, and limits the availability of nitric oxide. In turn, low vitamin D levels are linked to obesity, diabetes, dyslipidemia, hypertension, and an increased risk of cardiovascular disease, all of which can affect erectile function.[17]

Furthermore, research has demonstrated a clear correlation between vitamin-D levels and testosterone levels, with vitamin-D receptors located in the pituitary, brain, and testes.[17] According to a study, vitamin D supplementation is linked to increased blood testosterone levels and may play a significant part in helping men's erectile performance after receiving vitamin D.[18] In contrast, there is an inverse relationship between serum vitamin-D levels and artery calcification, a risk factor for erectile dysfunction. As a result, individuals with low vitamin-D levels have more prominent calcification, and this factor may potentially influence the frequency and severity of erectile dysfunction in these individuals.[19]

Overall, the findings indicate a correlation between male sexual function and blood vitamin D levels, and that increasing vitamin D levels can enhance erectile function. As a result, when assessing sexual dysfunction in men, blood vitamin-D levels should also be measured.[10] Research on how vitamin D affects female libido has also demonstrated benefits for enhancing libido.

Numerous mechanisms could account for this kind of outcome. According to a study on the function of vitamin D in controlling the synthesis of estrogen in animal gonads, hypovitaminosis-D causes disturbances to one or more elements of the hypothalamic-pituitary-ovarian axis. The results of this investigation indicate that regular vitamin-D levels are necessary for the gonads in both sexes to operate properly.[20] Additionally, there's evidence that women with sexual dysfunction have decreased testosterone levels.[21] Therefore, vitamin D can enhance sexual function, particularly sexual desire, by raising this hormone.[22]

It is important to take into account the local effects of vitamin D on the female vaginal area, which serves as a functional sexual organ. According to a recent study, vitamin D intake in postmenopausal women decreases vaginal dryness, modifies vaginal pH, and promotes the growth and proliferation of vaginal epithelial cells. A vitamin-D vaginal suppository has been shown by Rad et al to protect the vaginal squamous epithelium.[16] Consequently, one should not discount the local administration of vitamin-D to enhance vaginal conditions in anticipation of sexual intimacy.

CONCLUSION

Overall, research indicates that vitamin-D treatment significantly improved sexual function in both men and women. To demonstrate the value of monitoring serum vitamin D levels and administering vitamin D supplements in the treatment of sexual dysfunction in both males and females, more studies with bigger sample sizes are needed.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Samreen, Khan MI, Saxena A, Chakraborty R. Hypovitaminosis-D and sexual dysfunction. Int J Adv Med 2024;11:411-4.