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Evaluation of the effect of vitamin D on sexual satisfaction and self-efficacy in women of reproductive age

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Abstract

Introduction: Lack of sexual satisfaction and lack of sexual self-efficacy are common problems in women, affecting the quality of marital life. The present study was conducted with the aim of evaluating the effect of vitamin D on sexual satisfaction and self-efficacy in women of reproductive age. Methods: This clinical trial study was conducted on 102 women with sexual dysfunction and vitamin D level less than 30 ng/ml referring to health centers affiliated to Jundishapur University of Medical Sciences in Ahwaz in 2018. The research tools included Demographic Characteristics Questionnaire, Beck Depression Questionnaire, Larsson Sexual Satisfaction Questionnaire, and Sexual Self-efficacy Questionnaire. The research participants were randomly assigned into two groups of experimental and control (each group contained 51 people). The experimental group received oral vitamin D supplements in a dose of 1000 units per day and the control group received placebo (for 12 weeks). After the completion of the study, all the research samples completed the sexual satisfaction and sexual self-efficacy questionnaires and the levels of vitamin D were measured. Data were analyzed using the Chi-Square test, independent t-test, and SPSS 22 software. P-values less than 0.05 were considered significant. Results: The mean score of sexual satisfaction and sexual self-efficacy was higher in the experimental group than that in the control group after the intervention, and this difference was statistically significant ($p < 0.001$). Conclusion: Vitamin D supplement increases sexual satisfaction and self-efficacy in women of reproductive age.

Keywords: Vitamin D, sexual satisfaction, sexual self-efficacy, women, reproductive age.

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Introduction

Sexual satisfaction is one of the important factors in marital satisfaction affecting the quality of life of couples. It is considered as an important component of desired sexual health and sexual function (Pascoal et al., 2014). Sexual satisfaction of women is one of the important dimensions of sexual function. It refers to the judgment of each individual about his or her sexual behavior and the image of sexual pleasure (Modarres et al., 2013). Sexual desires are the intrinsic needs of every human being. Although marital life is partly related to sex, this relationship may be one of the most important causes of satisfaction and happiness in marital life (Bakhshayesh and Mortazavi, 2010). Sexual self-efficacy is needed to have a good sexual function (Steinke et al., 2008). In different studies, sexual self-efficacy has been reported as an important factor in creating healthy and satisfactory sex (Zimmer-Gembeck et al., 2013). Sexual self-efficacy theory is based on the assumption that one's belief in his or her ability in coping with special situations influences the mental, behavioral, and emotional patterns of humans at different levels of personal experience. It also determines whether a behavior will begin or not, and if it begins, how much will the person try to do it and how much he will resist against it (Bandura, 2006). Dezhkam states that 40 percent of divorces are due to sexual dissatisfaction (Dezhkam, 2000). The prevalence of sexual dysfunctions in American studies has been reported 43%, which is lower than that in Iran (Winre, 2012). Iranian experts argue that 55 to 65 percent of divorces are due to sexual dysfunctions and it seems that many Iranian couples suffer from sexual dissatisfaction but avoid it due to shame and many of them are not aware of the effect of lack of sexual satisfaction on their marital life (Shafi et al., 2010). One of the reasons for sexual dissatisfaction is reduced testosterone, which leads to reduced sexual desire (Berek, 2011).

Reduced vitamin D in the body may reduce sex hormones, especially testosterone (Chang et al., 2014). The study conducted by Ramlau-Hansen showed that weaker sperm parameters and lower concentrations of androgens are associated with a low level of vitamin D (Ramlau-Hansen et al., 2011). Vitamin D is a steroid hormone that plays a major role in the central and peripheral nervous system (Garcion et al., 2002). In a study entitled "Evaluation of vitamin D in pig granulosa cells", it was concluded that vitamin D is a strong regulator for the production of steroid hormones in pig granulosa cells (Hong et al., 2016). In a laboratory model, it was also shown that vitamin D deficiency causes a mutation in the Vitamin D Response (VDR) gene (nuclear receptors), leading to disruption in estradiol production, uterine hypoplasia, and damage to follicles. Moreover, it plays a major role in the production of steroid hormones such as testosterone and estrogen (Kinuta et al., 2000). A study conducted in 2016 showed that vitamin D could partly increase sexual satisfaction (Krysiak et al., 2016) Human studies have also proven the role of serum level of vitamin D in human reproductive functions (Sun et al., 2014). As sexual health in women is an important issue in the stability of the family and due to the lack of adequate studies and given what was stated above, the present study was conducted with the aim of evaluating the serum level of vitamin D on sexual satisfaction and self-efficacy in a sample of Iranian women in 2018.

Methodology

This clinical trial study was conducted on 102 non-depressed women with sexual dysfunction and vitamin D level less than 30 ng/ml referring to health centers affiliated to Jundishapur University of Medical Sciences in Ahwaz. The sample size was determined 102 people (51 people in each of the groups) by a statistics consultant and based on previous studies. Randomized sampling was also used in this study. The inclusion criteria of the study included women of reproductive age (18-45 years of old), having sex with a spouse, having only one spouse, reading and writing literacy, vitamin D level below 30 ng/ml. The exclusion criteria of the study included menopause, pregnancy and lactation, depression, history of chronic diseases, vaginal infections, taking antidepressants or blood pressure drugs, menstrual irregularities, and severe marital conflicts during the study. After obtaining the necessary permissions, the women were invited to participate in the research by stating the objectives and method of study and ensuring them that their information will remain confidential. After obtaining written consent, research questionnaires were given to them. The tools used in this study included demographic characteristics questionnaire, depression questionnaire, sexual satisfaction questionnaire, and self-efficacy questionnaire.

A. Beck Depression Questionnaire

This questionnaire is a tool used for assessing depression. This questionnaire contains 21 questions and reflects the feelings and symptoms of depressed people. Answers to questions are classified from 0 to 3 based on the severity of symptoms and the range of scores is between 0 and 63. The scores between 0 and 9 indicate a lack of depression, the scores between 10 and 16 indicate mild depression, the scores between 17 and 29 indicate moderate depression, and the scores between 30 and 63 indicate severe depression. Using Cronbach's alpha, reliability was obtained 0.84 for mentally ill patients and 0.81 for non-mentally ill patients (Berman, 2005). In a study conducted in Rouzbeh Hospital of Tehran University of Medical Sciences, the validity of 0.70 and reliability of 0.77 were reported for Beck Depression Questionnaire (Steer et al., 2000).

B. Larson Sexual Satisfaction Questionnaire

The questionnaire has 25 questions, answered in a 5-point Likert Scale with the range of never, rarely, most often, and always. A score of 1 to 5 is given for each of them. Accordingly, score 1 is given to option always, score 2 is given to option most often, score 3 is given to option sometimes, score 4 is given to option rarely, and score 5 is given to option never in the questions 1, 2, 3, 10, 12, 13, 16, 17, 19, 21, and 23. However, in rest of the questions, always receives score 1, most often receives score 2, sometimes receives score 3, rarely receives score 4, never receives score 5, and finally, the sum of scores is calculated. The scale used for data analysis is between 25 and 125. According to the score obtained, the dependent variable was classified into levels of sexual dissatisfaction (score less than 50), low sexual satisfaction (51-75), moderate sexual satisfaction (76-100), and high sexual satisfaction (score greater than 100).

C. Sexual self-efficacy questionnaire

Sexual self-efficacy questionnaire includes 10 questions scored on a 4-point Likert scale ranging from zero (not true at all) to 3 (quite true). The total score of 0 to 10 represents low self-efficacy, between scores 10 and 30 indicates moderate sexual self-efficacy, and a score higher than 30 indicates high self-efficacy.

Results

The demographic and obstetric characteristics of the studied women were tested in two experimental and control groups using independent t-test and Chi-square test. There was no significant difference between the two groups in terms of demographic and obstetric characteristics ($P \geq 0.05$) Table (1). The mean serum vitamin D value in the experimental group was 14.90 ± 6.20 ng/ml before the intervention and 26.65 ± 7.10 ng/ml after the intervention ($P = 0.001$). In other words, at the end of the study, the serum level of vitamin D in the experimental group increased by 11.75 ± 5.49 ng/ml. The mean serum vitamin D value in the control group was 18.48 ± 6.01 before the intervention and 14.80 ± 6.02 after the intervention. After 12 weeks, the level of vitamin D in the control group decreased by 3.71±1.95. The mean sexual satisfaction before and after intervention in the test group (P<0/001) and in the control group (P=0/042). There was a significant difference between the two groups using paired t-test. There was a significant difference in the mean sexual satisfaction between the two groups after the intervention using the independent t-test (P<0/001). Sexual satisfaction increased with increasing levels of vitamin D. In addition, there was a significant difference in the mean of self-efficacy before and after intervention in the test group (P<0/001) and in the control group

(p<0/001). There was a significant difference in the paired t-test. The mean of self-efficacy was statistically significant between the two groups after the intervention, using independent t-test (p<0/001) and also sexual self-efficacy increased with increasing levels of vitamin D (Tables 2 and 3)

Table 1

group Mean sexual satisfaction before and after intervention in the test group	Experimental group	Control group	p-value
Individual variables	SD ±mean	SD ±mean	
Age (year)	57.21 ±6.30	8.19 ±6.28	13.0
Spouse age (year)	5.11±6.30	59.27± 6.30	13.0
BMI km/m^2	33.±122.34	45.06±1.22	0.31
Number of children	12.1 ± 1.2	79.96 ± 0.1	0.41

		N (%)		
education	Elementary High school Academic	(41.2)21 (45.1)23 (13.7)7	(39.2)20 (49)25 8)6.(11	0.91
Spouse education	Elementary High school Academic	(49)25 (41.2)21 (10.2)5	(49.8)26 2)21.(41 09)4.(8	89.0
job	housewives employed	(82.4)42 (17.6)9	(80.4)41 (19.6)10	0.79
Delivery type	normal caesarian	(86.6)35 (31.4)16	(72.54)37 (27.45)14	0.87
Prevention method	normal pill ampule Iud No prevention	(43.1)22 (37.2)19 (1.96)1 (1.96)1 (15.6)8	(49.01)25 (39.2)20 0 0 (11.7)6	0.63

Table 2

Sexual satisfaction	Experimental n=51	control n=51	P-value
	SD± mean	SD± mean	
Before intervention	90.41 ± 7.75	62.64 ± 7.74	62.0
After intervention	91.87±7.95	07.52 ± 7.73	001.<0
P-value	001.<0	042.0	

Table 3

Sexual self-efficacy	Experimental n=51	control n=51	P-value
	SD± mean	SD± mean	
Before intervention	07.6 ± 3.9	42.49 ± 2.8	044.0
After intervention	86.11 ± 2.15	40.25 ± 2.8	001.0
P-value	001.<0	001.<0	

Discussion

The present study was conducted to evaluate the effect of vitamin D on sexual satisfaction and sexual self-efficacy in a sample of Iranian women with vitamin D deficiency and sexual dysfunction in 2018. Since the effects of the mentioned variables in various studies have been considered as a factor affecting the function and sexual satisfaction, they were controlled in this research by randomization by the researcher and the demographic and obstetric variables were matched. In different studies, sexual self-efficacy has been considered as an important factor in creating a healthy and satisfactory sexual relationship (Zimmer-Gembeck, 2013). In this study, it was found that the vitamin D supplement could be effective in increasing self-efficacy. It seems that this result has been reported in domestic studies for the first time and foreign studies are very limited in this regard. A study reported

that women's major problems could be resolved with increasing self-efficacy (Jalali-Chimeh et al., 2017). High sexual self-efficacy is associated with greater sexual compatibility and high sexual activity. In addition, low self-efficacy has a negative impact on sexual function and it is associated with high-risk sexual behaviors (Reissing et al., 2005). The cause of most of the marital incompatibilities is the lack of sexual satisfaction (Sandeep 2010). The results of a study conducted by Christens on sexual satisfaction in the United Kingdom showed that the satisfaction of parties with sexual relations has particular importance and has a direct association with marital satisfaction (Christens, 2011). The present study showed that vitamin D supplement improves sexual satisfaction and sexual self-efficacy. In line with the results of this study, a study has reported that women with vitamin D deficiency have a lower sexual satisfaction score (Krysiak et al., 2016) A study conducted by Jalali et al. showed that there is a direct and significant association between vitamin D level and sexual satisfaction (r = 0.27 and P = 0.01), (Jalali-Chimeh et al., 2017) which is in line with the result of the present study. Another study conducted on postmenopausal women found that vitamin D supplement could be effective in improving vaginal atrophy. Vaginal atrophy is one of the most common causes of reduced estrogen in postmenopausal women and the clinical symptoms caused by it include dryness, itching, burning, and pain during intercourse, leading to a reduction in sexual desire and quality and sexual satisfaction (Tadayon et al., 2012). The study conducted by Yildirim et al. reported that vitamin D could improve vaginal atrophy, which would result in sexual satisfaction (Yildirim et al., 2014).

In explaining the results of this study, several possible mechanisms could be proposed. Taheri et al. (2015) conducted a study entitled "The effect of vitamin D supplement on anti-Mullerian hormone Level in Fertility". The results of this study showed that women with vitamin D deficiency have a lower level of anti-Mullerian hormone of women of reproductive age. The results of the study showed that women with Vitamin D deficiency have a lower level of anti-Mullerian hormone and with the treatment of this vitamin deficiency, anti-Mullerian hormone increases to its maximum level (Taheri et al., 2015). Anti-Mullerian hormone secretes from growing follicles and is an indicator of the number and quality of the growing ovule in the menstrual cycle (Ocal et al., 2011). The results of a study conducted by Mohammad Beyghi et al. (2012) under the title of “The effect of calcium and Vitamin D on the success of induction of ovulation in women with polycystic ovarian syndrome”, it was shown that vitamin D supplement could increase the size of follicles (Mohammad Beigi et al., 2012). The study conducted by Chang et al. in 2014 showed a significant relationship between serum vitamin D levels and estradiol and a protein binding to sex hormone (Chang et al., 2014). Smith and Ergon stated that 40.9% of studied women had sexual arousal problems. Reduced sexual arousal may be associated with a reduction in sex hormones. Lack of adequate secretion to moisturize the vagina can lead to sexual dissatisfaction (Oksuz and Malhan, 2006). In a study conducted by Jalali-Chimeh et al. on the effect of Vitamin D on sexual function areas, a significant relationship was found between vitamin D level and sexual satisfaction (Jalali-Chimeh et al., 2017). The results of this study are in line with those of our study. Given the cultural and religious restrictions in Iranian society, people cannot easily talk about their sexual issues. Therefore, the likelihood of dishonesty in stating the problems in some of the subjects was one limitation that was beyond the control of the researcher. This study investigated an important and new issue among the domestic and foreign studies and its information can be the basis for analytical and causal studies. It is recommended for future studies to investigate this causal relationship in larger samples.

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References

Bakhshayesh, A. R., & MORTAZAVI, M. (2010). The relationship between sexual satisfaction, general health and marital satisfaction in couples.(Persian).

Bandura, A (2006). Adolescent development from an agentic perspective. *Self-efficacy beliefs of adolescents*, *5*, 1-43.

Berek JS (2011). Berek and Novak's gynecology. 15th ed. Philadelphia, PA: Lippincott Williams and Wilkins;270-320

Berman, J. R (2005). Physiology of female sexual function and dysfunction. *International journal of impotence research*, *17*(S1), S44.

Chang, E. M., Kim, Y. S., Won, H. J., Yoon, T. K., & Lee, W. S (2014). Association between sex steroids, ovarian reserve, and vitamin D levels in healthy nonobese women. *The Journal of Clinical Endocrinology & Metabolism*, *99*(7), 2526-2532.

Christens Sh (2011). The Effect Of marital counseling on sexual satisfaction. *J Marriage and family. 9*(13):9-64.

Dezhkam, M (2000). Marriage psychology. *Tehran: Mansha–Danesh*, *68*.

Garcion, E., Wion-Barbot, N., Montero-Menei, C. N., Berger, F., & Wion, D (2002). New clues about vitamin D functions in the nervous system. *Trends in Endocrinology & Metabolism*, *13*(3), 100-105.

Hong, S. H., Lee, J. E., Kim, H. S., Jung, Y. J., Hwang, D., Lee, J. H., ... & An, B. S (2016). Effect of vitamin D3 on production of progesterone in porcine granulosa cells by regulation of steroidogenic enzymes. *Journal of biomedical research*, *30*(3), 203.

Jalali-Chimeh, F., Darooneh, T., Ozgoly, G., Nasiri, M., & Vafa, M. R (2017). The relationship between serum level of Vitamin D and depression severity with sexual function in a sample of Iranian women in the year 2017. *J Isfahan Med Sch*, *35*(430), 558-64.

Kinuta, K., Tanaka, H., Moriwake, T., Aya, K., Kato, S., & Seino, Y (2000). Vitamin D is an important factor in

estrogen biosynthesis of both female and male gonads. *Endocrinology*, *141*(4), 1317-1324.

Krysiak, R., Gilowska, M., & Okopień, B (2016). Sexual function and depressive symptoms in young women with low vitamin D status: a pilot study. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *204*, 108-112.

Modarres, M., Rahimikian, F., & Booriaie, E (2013). Effect of pelvic muscle exercise on sexual satisfaction among primiparous women. Tehran: Hayat J. 18(4):10-8.[Persian].

Mohammad Beigi, R., Afkhamzadeh, A., & Daneshpour, N. S (2012). The effect of calcium-vitamin D in efficacy of induction ovulation in infertile women with polycystic ovary syndrome. *The Iranian Journal of Obstetrics, Gynecology and Infertility*, *15*(14), 7-13.

Ocal, P., Sahmay, S., Cetin, M., Irez, T., Guralp, O., & Cepni, I (2011). Serum anti-Müllerian hormone and antral follicle count as predictive markers of OHSS in ART cycles. *Journal of assisted reproduction and genetics*, *28*(12), 1197-1203.

Oksuz, E., & Malhan, S (2006). Prevalence and risk factors for female sexual dysfunction in Turkish women. *The Journal of urology*, *175*(2), 654-658.

Pascoal PM, Narcioo IDSB, Pereia NM. (2014). *What is sexual sathsfaction*. J Sex Res. 51(1):22-23

Ramlau-Hansen, C. H., Moeller, U. K., Bonde, J. P., Olsen, J., & Thulstrup, A. M (2011). Are serum levels of vitamin D associated with semen quality? Results from a cross-sectional study in young healthy men. *Fertility and sterility*, *95*(3), 1000-1004.

Reissing, E. D., Laliberté, G. M., & Davis, H. J (2005). Young women's sexual adjustment: The role of sexual self-schema, sexual self-efficacy, sexual aversion and body attitudes. *The Canadian Journal of Human Sexuality*, *14*(3/4), 77.

Sandeep K (2010). A Study of the occupational stress among teachers. *International Journal of Education Administration*, *2*(2), 421-432.

Shafi, A. A., Honarparvaran, N., Tabrizi, M., & Navabi, N. S (2010). Efficacy of emotion-focused couple therapy training with regard to increasing sexual satisfaction among, couples. *Iran J Psychiatry Clin Psychol.4*(15):59.[Persian]

Steer, R. A., Rissmiller, D. J., & Beck, A. T (2000). Use of the Beck Depression Inventory-II with depressed geriatric inpatients. *Behaviour research and therapy*, *38*(3), 311-318.

Steinke, E. E., Wright, D. W., Chung, M. L., & Moser, D. K (2008). Sexual self-concept, anxiety, and self-efficacy predict sexual activity in heart failure and healthy elders. *Heart & Lung*, *37*(5), 323-333.

Sun, W., Chen, L., Zhang, W., Wang, R., Goltzman, D., & Miao, D (2014). Active vitamin D deficiency mediated by extracellular calcium and phosphorus results in male infertility in young mice. *American Journal of Physiology-Endocrinology and Metabolism*, *308*(1), E51-E62.

Tadayon, M., Rad, P., Abbaspour, M. R., Latifi, S. M., Rashidi, I., Barati, M., & Delaaviz, H (2012). The effect of vitamin D suppository on atrophic vaginal mucosa in menopausal women. *Armaghane danesh*, *17*(3), 187-195.

Taheri, M., Modarres, M., & Abdollahi, A (2015). 189 The Effect of Vitamin D Supplementation on Anti-Mullerian Hormone Levels in Reproductive-Age Women. *Reproduction, Fertility and Development*, *27*(1), 185-186.

Winre, N (2012). Surveying the relation between attachment style to parents with female sexual function. *j Mental Health. 4*(52): 346- 55.

Yildirim, B., Guler, T., Akbulut, M., Oztekin, O., & Sariiz, G (2014). 1–Alpha, 25–Dihydroxyvitamin D3 Regresses Endometriotic Implants in Rats by Inhibiting Neovascularization and Altering Regulation of Matrix Metalloproteinase. *Postgraduate medicine*, *126*(1), 104-110.

Zimmer-Gembeck, M. J (2013). Young females' sexual self-efficacy: associations with personal autonomy and the couple relationship. *Sexual health*, *10*(3), 204-210.