Original Investigation

Association of sexual function and psychological symptoms (depression, anxiety and stress) in women with recurrent vulvovaginal candidiasis

Moshfeghy et al. Psychosexual symptoms in recurrent candidiasis

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Abstract
Objective: Recurrent vulvovaginal candidiasisis (RVVC) is one of the common vaginal infections in women which could affect their quality of life, romantic relationships, and sexual performance. There is some evidence that psychological problems result in the incidence of RVVC by changing the immune systems of individuals. The aim of this study was to determine the association of sexual function and psychological factors (depression, anxiety, and stress) in women with RVVC.
Material and Methods: In the case control study, fifty women with RVVC and 50 healthy women who referred to gynecology clinics were selected using convenience purposive sampling. Two samples of vaginal discharge were prepared from each person. A sample was produced under a microscope for direct observation of the organism with 10% potassium hydroxide secretions and another sample was cultured on Sabouraud Agar. Data collection tools used for this study included demographic questionnaire, Female Sexual Function Index, Depression Anxiety Stress Scales (DASS-21). Data were analyzed using SPSS software (version 19).
Results: Less sexual satisfaction (OR = 0.608, CI =0.421-0.878) and less orgasm (OR = 0.741, CI =0.530-0.998) have been associated with an increased risk of RVVC. In patients with RVVC, the levels of depression, anxiety and stress were significantly higher compared to those of healthy individuals.
Conclusion: Depression, anxiety and stress in the past 4 weeks are related to an increase risk of RVVC. There is an association between depression, anxiety and stress; sexual satisfaction; and orgasm with RVVC. It seems that psychological interventions and sexual counseling can be effective in improving RVVC.
Keywords: Sexual dysfunction; Stress; Depression; Anxiety; Vulvovaginal candidiasis

Introduction

Genital tract infections are common problems in women (1, 2). Vaginitis is an inflammation and infection of the vagina and its symptoms include itching or irritation, unusual and malodor discharge, leukorrhea and dyspareunia (3). According to the World Health Organization, Candida, Trichomonas, and bacterial infection are considered as the main factors causing vaginitis and these three factors constitute approximately 90% of vaginal infections (1).
Candida albicans is responsible for 85-95% of vaginal yeast infections (4). This disease is mostly seen in women of reproductive age (5). Studies have shown that the occurrence of this problem has been rare before the age of menarche and has been observed less commonly at postmenopausal ages (6, 7). This indicates the existence of a hormonal dependency for the infection (8).
It is estimated that 75% of women will have a vaginal yeast infection at least once in their lifetime. Approximately, 45% of women will experience this infection two or more times (4). Causes of the disease are various species of Candida, and Candida albicans is the most common cause and it is also the cause of 80-90% of the disease. Nevertheless, in patients with recurrent vaginal candidiasis, 15-47% of cases are caused by non-albicans species (9).

In studies carried out in different countries, the rate of infection with candidiasis is different. The rate in Nigeria has been 6.5% and in Turkey with culture method and clinical diagnosis, it has been reported as 17.4 and 14.1%, respectively (10, 11). In a study in Nigeria, the prevalence of this infection has been reported as 18.9% (12). In Iran, in cities of Tabriz, Sanandaj, Hamedan, Yazd, and Shiraz, the prevalence has been reported between 25-45% (9). The occurrence of 4 episodes or more of candidiasis per year is called recurrent vulvovaginal candidiasis (RVVC) (4). The prevalence of RVVC has been reported in a study which carried out in 5 European countries and the United States between 29% and 49% (13). In another study in Sweden in 2009, the incidence of RVVC with a diagnostic method of fungal culture was estimated as 29.8% (14). In Iran, in Sari, the incidence was reported as 24.2% (15).

Several factors play a role in the incidence of vaginal candidiasis, including antibiotics, pregnancy, diabetes mellitus, taking oral contraceptive pills, human immunodeficiency virus infection, wearing tight and nylon underwear with inadequate ventilation, vaginal douching, immunosuppression drugs, using intrauterine device, many sexual activities, local vaginal immune deficiency, using tampons instead of sanitary napkins, and oral sex; however, each of these factors could have an effect on incidence of recurrent chronic candida (4-6, 16). There is also some evidence that psychological problems result in the incidence of this disease (5).

Depression, helplessness, hopelessness, and stressful life events have caused the disease by changing the immune systems of individuals. Studies have shown that there is a relationship between the central nervous system and the immune system, and consequently, the incidence of various stresses affects immune system and its related diseases (17-19).

Chronic stress may reduce cellular immunity and affects hypothalamic-pituitary-adrenal axis reactions. If hypothalamic-pituitary-adrenal axis is active continuously for a long time, proper reaction to external acute stress may fail, and this will increase the susceptibility to inflammation and infections (16, 20).

In the other hand, some studies showed that there was a significant relationship between sexual dysfunction in individuals with a diagnosis of depression, anxiety, and stress (21, 22).

Psychosocial factors such as exposure to factors causing stress in daily life can lead to disruption of the sexual response cycle (23). Results of a study in Brazil revealed that women with RVVC had lower scores in the domains of orgasm and sexual satisfaction in comparison to women with localized vulvar vestibulitis syndrome (24).

Therefore, researchers conducted the present study due to the possible influence of psychological factors on the incidence of RVVC, the role of the psychological condition on women's sexual function and the lack of a study which shows the association between psychological factors (anxiety, stress, and depression) and sexual function in women with RVVC (5,16, 25). This study was aimed to determine the association of these two factors with RVVC in women who referred to gynecology clinics.

Materials and Methods

In this case control study, samples consisted of all married Iranian females attending gynecology clinics and were sexually active in the past four weeks. The women were in reproductive age and could complete the questionnaire or interview. Exclusion criteria included pregnant and lactating women, having previous or current history of cancer, patients undergoing chemotherapy, having immune deficiency diseases, and being under treatment of sexual and psychological problems. In addition, women who were in their menstrual period, women who had intercourse in the past 24 hours, and those who used vaginal creams a week prior to the study and used vaginal douching 48 hours before the study, and also the woman who were not willing to continue participating in the study were excluded.

Fifty women with RVVC and 50 healthy women who referred to gynecology clinics were selected using convenience purposive sampling. From October 2015 to June 2016, the researcher referred to the clinics every day, and after explaining the objectives of the project and obtaining written informed consent from individuals who desired to participate in the study, she started taking samples. After the preliminary review, when the selected individual was not included in the study due to the exclusion criteria, she was replaced by another person.

The samples in case group were the married females with a history of at least 4 episodes of vulvo-vaginal candidiasis per year. All patients had documented diagnosis of symptomatic episodes of infection in their patients' records in the clinic. The diagnosis was suggested clinically by Gynecologists who works in the clinic according to the presence of external dysuria and vulvar pruritus, pain, swelling, and redness and signs include vulvar edema, fissures, excoriations, and thick curdy vaginal discharge and microscope examination of the smear (KOH mounting) from the vagina. Additionally, the laboratory expert gave a definitive diagnosis of recent candida infection using mushroom cultivation and direct observation under a microscope slide. The control group consisted of healthy individuals who have referred to the clinics for routine screening. After direct observation under a microscope slide and taking samples of vaginal discharge culture, it was shown that they did not have RVVC. The data were collected via three questionnaires. The first part was related to demographic and obstetric characteristics. This questionnaire included demographic characteristics, pregnancy and childbirth information, contraceptive methods, history of fungal infections, bacterial vaginosis and trichomonas, history of

drug use, menstrual history, and the individuals' health information. The second questionnaire was the Female Sexual Function Index (FSFI). The 19-item questionnaire was designed to determine the sexual function status in women in the last 4 weeks. It assesses six domains of sexual desire (two questions), sexual excitation (4 questions), lubrication (4 questions), orgasm (3 questions), satisfaction (3 questions) and pain (3 questions), and has 6 Likert options of sexual activity (including, never, rarely, sometimes, often, always) which are scored for each domain. Therefore, at least the total scale score is 2 and maximum has been considered as 36. Generally, higher score indicates better sexual function (26, 27). Mohammadi et al., have determined reliability and validity of the Iranian version of this questionnaire. According to the study, reliability of scale and subscales for all the individuals was calculated as 0.85 for total score, 0.76 for sexual desire, 0.88 for sexual excitation, 0.88 for lubrication, 0.9 for orgasm, 0.71 for satisfaction and 0.87 for pain (27). The third questionnaire was Depression Anxiety Stress Scales (DASS-21). This questionnaire contains 21 questions and measures three domains of depression, anxiety, and stress of the individual 4 weeks prior to the study and is scored on Likert scale. Each subscale of this questionnaire includes 7 questions and final score of each is obtained from the total score for each question. Each question is scored between zero (does not apply at all in my case) to 3 (completely true in my case). Given that this questionnaire is the shortened form of the original scale (42 questions), the final score for each of the subscales should be doubled (28). Lovibond has reported 0.54 as the correlation between the two scales of depression and anxiety (29). The reliability and validity of the questionnaire has been evaluated by Samani and Joker in Iran. The retest reliability for depression, anxiety, and stress scales was 0.80, 0.76 and 0.77, respectively, and Cronbach's alpha for depression, anxiety, and stress was also reported as 0.81, 0.74 and 0.78, respectively (30).

After determining that the patients met the inclusion criteria, demographic and DASS-21 Questionnaire were completed by the samples during the first visit and FSFI Questionnaire was completed during the second visit when they referred to clinics to know the culture results and drug prescription.

The samples included in the study in both groups were examined in the lithotomy position. By inserting the speculum, researcher observed and assessed vaginal discharge in terms of color, odor, volume and other diagnostic features of Candida. Samples were collected from vaginal discharge and posterior fornix using a sterile cotton swab. Two swab samples were taken from each patient, one of which was placed on the slide for viewing under a microscope. The second swab was used for Sabouraud's dextrose agar culture in sterile conditions. Features such as number and date were recorded on the slide and at the end of each working day, the slides were sent to mycology laboratory of Faqihi hospital for viewing under a microscope and culturing. Examination of sample was carried out by an expert in mycology laboratory. The expert added a drop of potassium hydroxide to discharges of the first slide for viewing under a microscope. In the second sample for culture, a swab was placed on Sabouraud dextrose agar. The detection of fungi was done by observing yeast groups with false hyphae under a microscope. Then it was approved in a laboratory environment through culturing in agar medium. Finally women with positive microscopic results and positive swab cultures for fungi were assigned in case group, while women with negative microscopic results and negative swab cultures for fungi were assigned in control group. Data were analyzed using SPSS software version 19. To achieve the research objectives, independent t-test, Chi-square test, logistic regression, and Pearson correlation test were used. The significance level for all tests was 5%.

Results

The results showed that there was no significant relationship between demographic characteristics, method of contraception, having specific dietary habits with recurrent Candida infection in both case and control groups. The history of infection in women with recurrent Candida infections (N= 25) was significantly higher than healthy women (N=12)
($\chi 2$= 7.25, P=0.001). There were no significant differences regarding the use of vaginal douching between the two groups. However, the case group individuals (N=30) were significantly more inclined to wear tight clothes compared with the control group (N=4) ($\chi 2$= 30.1, P<0.001).

As shown in Table 1, the mean score of women's sexual function in domains of orgasm (P = 0.042), and satisfaction (P=0.005) was higher in case group and this difference was statistically significant. However, in other domains, there were no statistically significant differences between the two groups. The overall sexual function score in control group on average was two units more than the case group, and there was a statistically significant difference (P =0.043). In all domains, the mean of sexual function score in case group was lower than control group.

In this study, it was observed that less sexual satisfaction (OR=0.608, CI=0.421-0.878) and less orgasm (OR=0.741,CI=0.530-0.998) in the past four weeks have been associated with a higher risk of RVVC. There were no significant differences between the two groups in domains of desire, mental stimulation, lubrication, and pain (Table 2).

Frequency distribution of depression score (P<0.001), anxiety (P<0.001), and stress (P=0.037) in the two groups were compared using Fisher's exact test or chi square test. The results of this test showed the significance of the

severity of these disorders with RVVC in women, such that the frequency distribution of these disorders in case group compared to the control group showed a more severe situation.
Comparing mean scores of depression, anxiety, and stress in both groups showed that depression, anxiety, and stress levels were significantly higher in the case group than the control group and the difference between the two groups was statistically significant (Table 3).
In this study, it was observed that depression, anxiety and stress in the past 4 weeks were associated with an increased risk of RVVC (Table 4).
In addition, a significant and inverse correlation was obtained between the domains of overall sexual function and depression, anxiety, and stress (Table 5).

Discussion

The results showed that there were significant differences between the case and control groups regarding the overall sexual function score. Moreover, in the case group, sexual function score in all domains (desire, mental stimulation, lubrication, orgasm, satisfaction, and pain) has been lower than the control group. However in domains of orgasm and satisfaction, this difference was statistically significant. This study showed that less sexual satisfaction is associated with the increase risk of RVVC, however, the relationship of other domains of sexual function with the risk of RVVC has not been significant.
In a study, researchers examined sexual function of 58 Brazilian women (11 patients with RVVC, 18 patients with localized vulvar vestibulitis and 29 healthy individuals) and their result revealed that the individuals with RVVC and localized vestibulitis syndrome had significantly lower sexual function scores than the women in the control group, and people with RVVC had significantly lower scores for satisfaction and orgasm domains (24). However, it was not shown for other domains, which is consistent with the findings of the current research. In another study in Turkey, different results were obtained. The study was conducted on 114 women in three groups. The first group included 58 women with no vaginal discharge, the second group included 29 women with abnormal vaginal discharge with itching and in the third group, 27 women had abnormal discharge without itching. Their results showed that women with abnormal vaginal discharge with or without itching had significantly higher overall score of sexual function compared to that of control group (31). These differences can be attributed to the selection of samples based on subjective information and not using valid diagnostic criteria of discharge culturing. It also seems that small sample size in women with abnormal vaginal discharge in the study could also play a major role in achieving results contrary to the results of the present study.
The results showed that there was a significant relationship between depression, anxiety, and stress and RVVC. These findings imply that levels of depression, anxiety, and stress in patients with RVVC have been higher than healthy individuals. The result is consistent with another study which showed both chronic stress and reduced antioxidant capacity can be host predisposing factors for RVVC. It seems that a dysregulation in immune function increases the risk of RVVC (16, 20, 32).
In a study the Short-Form Health Survey (SF-36) was used to measure Health-related quality of life in 101 healthy women and 102 women with RVVC. The results showed that women with RVVC had lower physical and mental composite scores compared with controls (5). Although the scales used to measure stress and mental health in two studies were not similar, the results of both emphasized that women with this infection had more stress.
Another study showed that women with chronic vaginal symptoms such as RVVC, vestibulitis syndrome and inflammatory vulvovaginitis had high rates of mental disorders (33). The result supported by other study showed that psychosocial risk factors, particularly stress, were the main causes of RVVC (34).
The findings of the present study showed a significant and inverse correlation between the domains of sexual function and depression, anxiety, and stress. A study showed that there was a significant relationship between psychiatric disorders, history of psychiatric medicine and female sexual function (35). Although the study was not conducted on women suffering from RVVC, its findings regarding the significant relationship between mental disorders and sexual dysfunction were consistent with the present study. A study in Egypt showed that higher anxiety correlated with female sexual dysfunction (22). The results of the study were consistent with the present study. Another study showed that trait anxiety and anxiety sensitivity were related to greater self-reported female sexual arousal outside the laboratory (36). The etiology of anxiety, not the experience of anxiety per se, seems to interfere adversely with sexual function.
Some studies showed high prevalence of female sexual dysfunction in depressed women regardless of type and severity of depression (25, 37). Sexual dysfunction occurs at any stage of the sexual response cycle and reduces the quality of life of many women. Multiple psychological distresses could be enough signs to recognize sexual problems (38).
It seems that the reduction of sexual satisfaction and orgasm can affect mental state of women including stress, anxiety and depression. As these problems increase, they can affect the immune system and the body becomes more susceptible to infections, and ultimately, they lead to an increase in RVVC. As demonstrated by the results of this study, sexual function status in these women had reverse association with mental disorders (anxiety,

stress, and depression). Thus, if the status of sexual function has a lower score, these mental disturbances will be more.

The present study is bridging the research gap in the field of mental health and sexual function in women with RVVC. In fact, this study can be considered as a preliminary study for planning interventional and medical designs in patients with RVVC. This study has some limitations. The study was conducted only in Fars province. Additionally, Due to case-control design of study, we could not assess causal connection between mental disorders and RVVC. It seems that design of cohort studies or randomized control trial with psychological intervention could present more precise finding.

Conclusion

The results of the present study showed that the reduction in sexual satisfaction, orgasm and mental disturbances (anxiety, depression and stress) in the past month is associated with an increased risk of RVVC. Therefore, mental disorders may be one of the causes of RVVC. In addition, this study showed an inverse relationship between sexual dysfunction and mental disturbances (stress, anxiety and depression) and mentioned that a reduction in sexual satisfaction and orgasm could increase anxiety, depression and stress, which eventually increases the likelihood of RVVC. Therefore, it is imperative that the patients be provided with the required actions such as sexual counseling and psychotherapy techniques, such as relaxation, in order to enhance their mental performance and reduce their stress.

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Ethics Committee Approval: The research was approved by the Ethics Committee of the Deputy of Research and Technology Shiraz University of Medical Sciences (Ethical code no: 7592).

Informed Consent: Informed consent was obtained from all individual participants included in the study.

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References

1. World Health Organization. Global health sector strategy on Sexually Transmitted Infections 2016-2021. 2016.
2. Gil NF, Martinez RCR, Gomes BC, Nomizo A, Martinis ECPD . Vaginal lactobacilli as potential probiotics against Candida spp. Braz J Microbiol 2010*;* 41: 6–14.
3. Hainer LB, Gibson MV. Vaginitis: Diagnosis and Treatment. Am Fam Physician 2011; 83: 807-15.
4. Berek JS. Bereks and Novak's Gynecology. Lippincott Williams and Wilkins. Philadelphia; 2012.
5. Zhu YX, Li T, Fan SR, , Liu XP, Liang YH, Liu P. Health-related quality of life as measured with the Short-Form 36 (SF-36) questionnaire in patients with recurrent vulvovaginal candidiasis. Health Qual Life Outcomes 2016; 14:65.
6. Ekpenyong CE, Inyang-etoh EC, Ettebong EO, Akpan UP, Ibu JO, Daniel NE. Recurrent vulvovaginal candidosis among young women in south eastern Nigeria: the role of lifestyle and health-care practices. Int J STD AIDS 2012; 23:704-9.
7. Akbarzadeh M, Bonyadpour B, Pakshir K, Mohagheghzadeh A. Causes and clinical symptoms of vaginal candidiasis in patients referring to selective clinics of Shiraz University of Medical Sciences (2009). J Arak Uni Med Sci 2010; 13:12-20.
8. Gunther LS, Martins HP, Gimenes F, Abreu AL, Consolaro ME, Svidzinski TI. Prevalence of Candida albicans and non-albicans isolates from vaginal secretions: comparative evaluation of colonization, vaginal candidiasis and recurrent vaginal candidiasis in diabetic and non-diabetic women. Sao Paulo Med J 2014; 132:116-20.
9. Roozbahani F, Kariman N, Mojab F, Nasiri M. Effect of Myrtus communis capsule on vaginal candidiasis treatment. Pajoohandeh J 2013; 18: 242-49. (Persian)
10. Emeribe AU, Nasir IA, Onyia J, Ifunanya Al. Prevalence of vulvovaginal candidiasis among nonpregnant women attending a tertiary health care facility in Abuja, Nigeria. Res Rep Trop Med 2015; 6:37-42.

11. Esim BE, Kars B, Karsidag AY, Karadeniz BI, Kaymaz O, Gencer S, et al. Diagnosis of vulvovaginitis: comparison of clinical and microbiological diagnosis. Arch Gynecol Obstet 2010; 282: 515–19.
12. Onianwah IF. The Incidence and Prevalence of Candida albicans infection of the urogenital tract of females between the ages of 18 and 45 years old: A Case study of Patients receiving treatment in Ashford and Patrice clinic in Port Harcourt. Int Res J Environment Sci 2014; 3: 101-4.
13. Foxman B, Ryan Muraglia, Dietz JP. Prevalence of Recurrent Vulvovaginal Candidiasis in 5 European Countries and the United States: Results from an Internet Panel Survey. J Low Genit Tract Dis 2013; 17: 340-45.
14. Weissenbacher T, Witkin S, Ledger W, Tolbert V, Gingelmaier A, Scholz C, et al. Relationship between clinical diagnosis of recurrent vulvovaginal candidiasis and detection of Candida species by culture and polymerase chain reaction. Arch Gynecol Obstet 2009; 279:125-9.
15. Hedayati MT, Taheri Z, Galinimoghadam T, Aghili SR, Yazdani Cherati J, Mosayebi E. Isolation of Different Species of Candida in Patients With Vulvovaginal Candidiasis From Sari, Iran. Jundishapur J Microbiol 2015; 8: e15992.
16. Ehrström S, Kornfeld D, Thuresson J, Rylander E. Signs of chronic stress in women with recurrent candida vulvovaginitis. Am J Obstet Gynecol 2005; 193:1376-81.
17. Leonard BE. The concept of depression as a dysfunction of the immune system. Curr Immunol Rev 2010; 6: 205-12.
18. Hinkle JL, Cheever KH. Brunner and Suddarth's Textbook of Medical-Surgical Nursing, Philadelphia: Wolters Kluwer. Pennsylvania; 2018.
19. Leonard BE. Inflammation and depression. Acta Neuropsychiatr 2018; 30: 1-16.
20. Ehrström S, Kornfeld D, Rylander E. Perceived stress in women with recurrent vulvovaginal candidiasis. J Psychosom Obstet Gynaecol 2007; 28:169-76.
21. Yazdanpanahi Z, Beygi Z, Akbarzadeh M, Zare N. To investigate the relationship between stress, anxiety and depression with sexual function and its domains in women of reproductive age. Int J Med Res Health Sci 2016; 5: 223–31.
22. Arafa AE, Senosy SA. Female sexual dysfunction in Egyptian women with anxiety: prevalence and patterns. J Public Health 2018.
23. Jafarnejad F, Kazemayni H, Mazloom R, Emamimoghadam Z, Sefidgaran A. Study on the Effect of Colporrhaphy on Women's Sexual Function and Satisfaction. Iran J Obstet Gynecol Infertil 2013; 16:14-23.
24. Giraldo PC, Polpeta NC, Juliato CR, Yoshida LP, do Amaral RL, Eleutério Junior J. Evaluation of Sexual Function in Brazilian Women with Recurrent Vulvovaginal Candidiasis and Localized Provoked Vulvodynia. J Sex Med 2012; 9: 805-11.
25. Chaudhury S, Mujawar S. Depression and female sexual dysfunction. J Psychiatr Res Treat 2017; 1: 1-2.
26. Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, et al. Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. J Sex Marital Ther 2000; 26:191-208.
27. Mohammadi Kh, Heydari M, Faghihzadeh S. The female sexual function index (FSFI): validation of the Iranian version. J of Payesh 2008; 7:269-78. (Persian)
28. Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson RP. Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. Psychological Assessment 1998; 10:176-81.
29. Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behav Res Ther 1995; 33: 335-43.
30. Samani S, Jokar B. A study on the reliability and validity of the short form of the depression anxiety stress scale (Dass-21). J Social Sci Humanities of Shiraz University 2007; 26: 65-76.
31. Gungora ANC, Uludagb A, Sahinb M, Gencer M, Uysal A. Effects of vaginal discharge on female sexual function. Int J Gynecol Obstet 2014; 124: 27-9.
32. Akimoto-Gunther L, Bonfim-Mendonça Pde S, Takahachi G, Irie MM, Miyamoto S, Consolaro ME, et al. Highlights Regarding Host Predisposing Factors to Recurrent Vulvovaginal Candidiasis: Chronic Stress and Reduced Antioxidant Capacity. PloS One 2016; 11: e0158870.
33. Nyirjesy P, Peyton C, Weitz MV, Mathew L, Culhane JF. Causes of chronic vaginitis: analysis of a prospective database of affected women. Obstet Gynecol 2006; 108:1185-91.
34. Meyer H, Goettlicher S, Mendling W. Stress as a cause of chronic recurrent vulvovaginal candidosis and the effectiveness of the conventional antimycotic therapy. Mycoses 2006; 49: 202-9.

35. Mazinani R, AkbariMehr M, Kaskian A, Kashanian M. Evaluation of prevalence of sexual dysfunctions and its related factors in women. Razi J Med Sci 2012; 19:61-8. (Persian)
36. Bradford A, Meston C M. The impact of anxiety on sexual arousal in women. Behav Res Ther 2006; 44; 1067-77.
37. Sreelakshmy K, Velayudhan R, Kuriakose D, Nair R. Sexual dysfunction in females with depression: a cross-sectional study. Trends Psychiatry Psychother 2017; 39: 106-9.
38. Clayton AH, Hamilton DV. Female sexual dysfunction. Psychiatr Clin North Am 2010; 33: 323-38.

Table 1. Comparison of mean score of sexual function in both case and control groups

Sexual Function	Groups		Statistical Index	p-value*
	Case (n=50) (Mean±SD)	Control (n=50) (Mean±SD)		
Desire	3.2±0.97	3.46±0.75	1.45	0.149
Mental stimulation	3.64±1.11	3.82±1.02	0.821	0.414
Lubrication	3.83 ± 1.10	4 ± 0.91	0.806	0.422
Orgasm	4.17±1.36	4.46±1.01	2.06	0.042
Satisfaction	3.86±1.28	4.83±0.86	2.86	0.005
Pain	3.78±1.38	4.18±1.17	1.31	0.193
Overall domains	22.73±5.73	24.77±4.03	2.04	0.043
*p<0.05 was considered statistically significant; T-test was used for all variables				

Table 2. Association of sexual function with recurrent vulvovaginal candidiasis in both case and control groups

Sexual function	Beta	OR*	95% CI		p-value*
Desire	- 0.306	0.736	1.143	0.474	0.173
Mental stimulation	- 0.122	0.886	1.246	0.629	0.486
Lubrication	- 0.126	0.882	1.248	0.623	0.478
Orgasm	- 0.300	0.741	0.998	0.530	0.044
Satisfaction	- 0.497	0.608	0.878	0.421	0.008
Pain	- 0.180	0.835	1.125	0.620	0.237
General areas	- 0.066	0.936	0.993	0.870	0.042
*p<0.05 was considered statistically significant; Logistic regression analysis was used for all variables					

Table 3. Comparison of mean scores of depression, anxiety and stress between two case and control groups

Variable	Groups		T-test Index	p-value*
	Case (Mean±SD)	Control (Mean±SD)		
Depression	20.96±11.07	12.44±10.56	3.13	<0.001
Anxiety	20.72±11.44	11.72±8.94	3.38	<0.001
Stress	23.32 ±10.12	16.68 ±10.47	3.22	0.002
*p<0.05 was considered statistically significant; T-test was used for all variables				

Table 4. The association of depression, anxiety, and stress with recurrent vulvovaginal candidiasis in case and control groups

Variable	Beta	OR	95% CI		p-value*
Depression	0.070	1.073	1.116	1.032	<0.001
Anxiety	0.082	1.086	1.132	1.041	<0.001
Stress	0.62	1.064	1.109	1.022	0.003
*p<0.05 was considered statistically significant; Logistic regression analysis was used for all variables					

Table 5. The correlation between the scores of different domains of sexual function and scores of depression, anxiety and stress in both case and control groups

Scores of sexual function	Depression		Anxiety		Stress	
	p*	r	p*	r	p*	r
Desire	<0.001	- 0.39	0.004	- 0.28	0.006	- 0.27
Mental stimulation	<0.001	- 0.42	0.002	- 0.30	<0.001	- 0.33
Lubrication	<0.001	- 0.47	<0.001	- 0.33	0.004	- 0.28
Orgasm	<0.001	- 0.36	<0.001	- 0.45	<0.001	- 0.56
Satisfaction	<0.001	- 0.32	<0.001	- 0.41	<0.001	- 0.52
Pain	<0.001	- 0.32	<0.001	- 0.34	<0.001	- 0.36
Overall domains	<0.001	- 0.39	<0.001	- 0.44	<0.001	- 0.56
*p<0.05 was considered statistically significant; Pearson correlation coefficient was used for all variables						