

Sexual function in patients and their partners before and after bone marrow transplantation. A cross-sectional study in Iran

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ABSTRACT

Background: Bone marrow transplantation has revolutionized the management of many cancers and hematologic diseases. Some early and late complications may affect the recovery in the ensuing months. Physical, psychosocial functioning and different aspects of the quality of life could inadvertently be affected. So, the aim of study was to investigate the sexual dysfunction of Iranian patients and their partners before and after bone marrow transplantation.

Methods: This cross-sectional study was performed on 100 bone marrow transplant patients and 100 sexual partners. Prevalence and severity of sexual problems were measured by the Arizona Sexual Experiences Scale (ASEX) Questionnaire in all subjects before and after 6 months of bone marrow transplantation. Depression and anxiety were assessed using the Hospital Anxiety and Depression Score (HADS) questionnaire.

Results: The mean age of patients and their partner was 40.34 ± 9.8 years and the mean duration of relationship was 23.74 ± 5.6 years. The results demonstrated a significant increase in the rate of sexual disorders 6 months after bone marrow transplantation ($P < 0.05$). Depression and anxiety increased in the patient group at 6 months, but this increase was not significant ($P > 0.05$). Patients' sexual partners also had similar results to those seen in patients. Besides, a significant and direct correlation was found between the ASEX test score and the degree of depression in the patient group and their sexual partner at the end of the study ($P < 0.05$). Duration of relationship was also significantly correlated with ASEX scores and depression scores only before the transplant. Other pre- and post-transplant demographic characteristics did not correlate significantly with ASEX and HADS scores.

Conclusion: This study showed that bone marrow transplantation not only increases sexual dysfunction in patients, but also cause these dysfunctions in their sexual partner.

Keywords: sexual dysfunction, bone marrow transplantation, patient information

INTRODUCTION

The last developments in the treatment of hematological malignancies have enhanced survival rates and life anticipation. This raises the question of the extent to which future sexual status is impaired by the side effects of cancer treatment[1-3]. It has been shown that sexual dysfunction in the general population affects 40% - 45% of adult women and 20% - 30% of adult men[4]. Evidence suggests that sexual dysfunction is a threat to the enjoyment of life and marital relationship and may lead to impaired coping ability in patients with chronic illness[5]. However, sex is an issue that has been overlooked in public health and must understand the complex relationship between sex, health and disease[6]. The World Health Organization (WHO) uses the concept of health in a biological, psychological and social paradigm where sex is defined as a major part of human life including sex, gender identity, roles, sexual orientation and preproduction. In addition, sex is affected by the interaction of biological, psychological, social, economic, political issues, as well as disease, e.g., bone marrow transplantation for the treatment of diseases[7, 8].

Allogeneic hematopoietic stem cell transplantation (HCT) is an useful curative treatment for many patients with hematologic malignancies[9, 10]. The use of HCT has elevated over the last decade, with >20,000 transplantations carried out in the United States every year,

of which 40% arise in patients aged <45 years[11, 12]. Although bone marrow transplantation has been successfully used to treat a variety of malignant and non-malignant diseases, but bone marrow transplantation is associated with a significant risk of physical and psychosocial diseases[13].

Transplant-related mortality is evident throughout the bone marrow transplantation period, beginning with the pre-transplant preparation period until the post-transplant recovery phase[14, 15]. This invasive treatment is associated with short- and long-term toxicities that can potentially cause changes in sex and sexual function[16]. Long-term complications, such as post-transplant sexual dysfunction, should be addressed with increasing survival rates after bone marrow transplantation. Long-term sexual complications included a variety of factors including decreased libido, vaginal changes, erectile dysfunction and premature ejaculation, premature menopause, dysfunction of sex hormones, dyspyronia and infertility[17]. In addition, 45% of men and 33% of women, who have undergone bone marrow transplantation, have decreased their quality of sex life [18, 19]. One of the important factors in sexual dysfunction of allogeneic bone marrow transplant patients is chronic graft-versus-host disease (GVHD)[20]. GVHD is a complex immune-related inflammatory reaction in which the donor (transplanted) immune cells recognize the host body as an external organism and therefore invade its cell

and tissue[21]. GVHD can be seen anywhere in the body. In the genital organs, it may lead to vaginal stenosis, scar tissue and adhesion to blood vessels, rashes and increased skin sensitivity[22]. Therefore, in this study we aimed to investigate sexual dysfunction before and after bone marrow transplantation in bone marrow transplant patients and their partner.

MATERIALS AND METHODS

Patients: This cross-sectional study was performed on 100 bone marrow transplant patients and 100 sexual partners who referred to Ayatollah Taleghani Hospital in Tehran during the years 2017-2019. Questionnaire was used for data collection and sampling method was convenience sampling. Candidate patients were enrolled in the study after obtaining informed consent.

In this study inclusion criteria were included, 1. Married, 2- Over 18 years old, 3. Get a canine that needs bone marrow transplant, 4- Menopause in women at the beginning of the study, 5. No previous record of sexually transmitted diseases undergoing drug treatment, 6. No previous record of major psychiatric illnesses, depression, and anxiety undergoing drug treatment. In addition, exclusion criteria included, 1. Lack of cooperation from the patient and patient's sexual partner or both 6 months after transplant, 2. Death of patient, patient's sexual partner or both, 3. Divorce, 4. Previous history of sexually transmitted disease undergoing therapy s, 5. Previous history of depressive and anxiety disorders undergoing drug therapy. Regarding prevalence of sexual dysfunction (14% and 44%) before and after transplantation (13) and type I error 5% and type II 20% sample size was calculated as 100 based on the following formula:

$$n = \frac{(p_1(1 - p_1) + p_2(1 - p_2))(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{(p_1 - p_2)^2}$$

In addition, permission was obtained from Shahid Beheshti University of Medical Sciences for research. Written permission was obtained from the Research Ethics Committee of Shahid Beheshti University of Medical Sciences. In addition, written consent was obtained from participants to enter the study. The research unit was assured of the confidentiality of the obtained information. Ethics and confidentiality were considered during the data collection. The research results were made available to the hospital as desired.

METHOD OF STUDY

After obtaining written consent, two questionnaires including demographic information and the Arizona Sexual Experiences Scale (ASEX), which reliability and validity has been confirmed, were used to assess sexual dysfunction. The Hospital Anxiety and Depression Score (HADS) questionnaire was also used to assess depression and anxiety of patients and their sexual partners. Prose letters were completed 6 months before and after bone marrow transplantation by the patient and partner at baseline and after bone marrow transplantation. Items are scored on a 6-item scale ranging from 1 (hyperfunction) to 6 (hypo function). The total score will be scored on a scale of 5 to 30. In this questionnaire, a score of 1 was defined as

extremely easy, followed by an easy answer (score 2), sometimes very high (score 3), sometimes poor (score 4), very poor or very difficult (score 5), and never (Score 6). HADS questionnaire also included 14 questions. The scoring in this questionnaire is that each question has a rating of 0 to 3 and 7 questions assess anxiety disorders.

Statistical analysis: Data were analyzed by SPSS v.16. To investigate the normal distribution of variables, Shapiro-Wilk or Kolmogorov-Smirnov tests were used. Mann-Whitney test was applied to compare mean values in the two groups. Pearson test was also used to investigate the correlation between the data. P-values less than 0.05 was considered as significant level.

RESULTS

In this study, a total of 200 patients including 100 patients (54 males, 46 females) and 100 sexual partners were initially enrolled. At the end of 6 months, 15 male patients and their sexual partners were excluded due to inaccessibility or failure to respond (1 case), divorce (1 case), death (1 case) and unwillingness to continue (12 cases). In the women group, 14 patients and their sexual partners were excluded for reasons such as death (4 cases), death of the patient's spouse (1 case), inaccessibility or lack of response (2 cases) and unwillingness to continue cooperation (7 cases). Patient follow-up was performed after 6 months using social networks (telegram and WhatsApp; 58 cases), telephone (10 cases), email (2 cases), and face to face interview (1 cases). Finally, 71 patients including 39 men, 32 women and their sexual partners were examined. The mean age of patients and their partner was 40.34 ± 9.8 years, and mean age of marriage was determined as 23.74 ± 5.6 . Table 1 summarized demographic information of patients and their sex partners, including educational level, occupation, duration of marriage, number of marriages, willing or unwanted marriage, and desire to have children.

The secondary objectives of this study were to investigate the prevalence of sexual disorders in patients and their sexual partners based on demographic characteristics. The prevalence of sexual dysfunction in men before bone marrow transplantation was as follows: Out of 39 patients 34 (87.2%) were unaffected and 5 (12.8%) had sexual dysfunction. After bone marrow transplantation, of the 39 patients, 22 (59%) had no sexual dysfunction, and 17 (41%) had the disorder. Of the 32 female patients before bone marrow transplantation, 22 (68.8%) had this disorder and 10 (31.2%) had no sexual dysfunction. After bone marrow transplantation, out of 32 female patients, 13 (40.6%) had sexual dysfunction and 19 (59.4%) did not.

The prevalence of sexual dysfunction prior to bone marrow transplantation in the female partner (male) was as follows: Of 32 patients, 30 (93.7%) had no sexual dysfunction and only 2 (6.3%) had sexual dysfunction. Of the 32 patients, 26 did not have this disorder after bone marrow transplantation, and 6 had sexual dysfunction. Among female's partners, 35 (89.7%) out of 39 had no sexual dysfunction before bone marrow transplantation, and 4 (10.3%) had abnormalities. 29 (74.4%) had sexual dysfunction and 10 (25.6%) no longer had this disorder after bone marrow transplantation.

Table 1: Demographic information of patients and their sex partners

Variable		Frequency	Percent
Type of malignancy	AML	30	42
	ALL	19	27
	CML	14	20
	CLL	8	11
Level of Education	illiterate	10	7
	Less than academic	64	45
	Academic	68	48
Employment status	Unemployed	37	26
	Employee	85	60
	Retired	20	14
Duration of marriage	5>	26	18
	5-10	37	26
	10>	79	56
Type of marriage	Wanted	135	95
	Unwanted	7	5
Age	>40	74	52
	<40	68	48
Marriage age	>20	41	29
	<20	101	71

The prevalence of sexual dysfunction in the studied patients and their sex partners, before and after bone marrow transplantation by age, educational, employment status, type of marriage and duration of marriage, was evaluated in Table 2, of which 69 (93.2%) were under 40 years of age without this disorder prior to bone marrow transplantation, and only 5 were involved, while, 26 (35.1%) were affected by disease after transplantation. In addition, most people with no sexual dysfunction were in the university education group (55 cases, 86.7%), and decreased to 44 (64.7%) after bone marrow transplantation. In terms of employment status, the majority of those without this disorder were in the occupied subjects with 76 patients (89.4%). It found 61 (71.8%) patients after bone marrow transplantation, indicating an increasing trend. Also, in wanted marriages, 114 (84.4%) were unaffected, but decreased to 84 (66.9%) after bone marrow transplantation. In marriages over 10 years, the number of people who had no sexual dysfunction was 58 (73.4%), indicating the largest number. The least included marriages less than 5 years (26 people, 100%).

Patients' sexual dysfunction was assessed by age at marriage before and after bone marrow transplantation. In

marriages < 10 years, 27 (65.9%) patients did not have this disorder before bone marrow transplantation and 14 (34.1%) had sexual dysfunction but 21 (51.2%) had no sexual dysfunction after bone marrow transplantation and 20 (48.8%) exhibited this disorder. But at the marriage age of 20 years or older, 94 (93.1%) had no abnormalities before bone marrow transplantation, and only 7 (6.9%) showed dysfunction, while 69 (68.3%) didn't exhibit sexual dysfunction after bone marrow transplantation, and 32 (31.7%) were affected.

Table 3 shows the rates of sexual dysfunction in patients before and after bone marrow transplantation by education, employment status and duration of marriage. Most patients with pre-transplant sexual dysfunction had university education and 6 had less education. After bone marrow transplantation, 20 exhibited a lower degree, but 13 demonstrated to have a university degree. In the case of pre-bone marrow transplant recipients, most (33 subjects, 82.5%) did not have sexual dysfunction, and then the number of transplants decreased to 27 (67.5%). Also, the person with this disorder was not seen at the time of marriage less than 5 years and between 5 and 10 years before bone marrow transplant. After bone marrow

transplantation, 5 (35.7%) and 14 (82.4%) patients, with less than 5 years and between 5 and 10 years of marriage, had this dysfunction, respectively.

Table 2: Prevalence of Patients' Sexual dysfunction before and after transplant by age, educational, type of marriage and duration of marriage

Variable		Sexual dysfunction before transplant	Frequency (%)	Sexual dysfunction after transplant	Frequency (%)
Age	>40	No	69 (93.2%)	No	48 (64.9%)
		Yes	5 (6.8%)	Yes	26 (35.1%)
	<40	No	53 (76.5%)	No	42 (61.8%)
		Yes	16 (23.5%)	Yes	26 (38.2%)
Educational	Illiterate	No	7 (70%)	No	7 (70%)
		Yes	3 (30%)	Yes	3 (30%)
	Less than academic	No	55 (85.9%)	No	39 (60.9%)
		Yes	9 (14.1%)	Yes	25 (39.1%)
	Academic	No	59 (86.7%)	No	44 (64.7%)
		Yes	9 (13.2%)	Yes	24 (35.3%)
Employment status	Unemployed	No	29 (78.4%)	No	17 (45.9%)
		Yes	8 (21.6%)	Yes	20 (54.1%)
	Employed	No	76 (89.4%)	No	61 (72.8%)
		Yes	9 (10.6%)	Yes	24 (28.2%)
	Retired	No	15 (75.0%)	No	12 (60%)
		Yes	5 (25/0%)	Yes	8 (40%)
Type of marriage	Wanted	No	114 (84.4%)	No	84 (66.9%)
		Yes	21 (15.6%)	Yes	51 (33.1%)
	Unwanted	No	7 (100%)	No	6 (85.7%)
		Yes	0 (0%)	Yes	1 (14.3%)
Duration of marriage	>5	No	(100%) 26	No	19 (73.1%)
		Yes	(%0) 0	Yes	7 (26.9%)
	5-10	No	(100%) 37	No	17 (45.9%)
		Yes	(%0) 0	Yes	20 (54.1%)
	<10	No	(%73.4)58	No	54 (68.4%)
		Yes	(%26.6) 21	Yes	25 (31.6%)

Table 3: Rate of sexual dysfunction in patients based on educational, employment status and duration of marriage

Variable		Sexual dysfunction before transplant	Frequency (%)	Sexual dysfunction after transplant	Frequency (%)
Education al	illiterate	No	1 (25%)	No	1 (25%)
		Yes	3 (75%)	Yes	3 (75%)
	Less than academic	No	30 (83.3%)	No	16 (44.4%)
		Yes	6 (16.7%)	Yes	20 (55.6%)
	Academic	No	25 (80.1%)	No	18 (58.1%)
		Yes	6 (19.3%)	Yes	13 (42.9%)
Employment status	Unemployed	No	14 (73.7%)	No	2 (10.5%)
		Yes	5 (26.3%)	Yes	17 (89.5%)
	Employed	No	33 (82.5%)	No	27 (67.5%)
		Yes	7 (17.5%)	Yes	13 (32.5%)
	Retired	No	9 (75%)	No	6 (50%)
		Yes	3 (25%)	Yes	6 (50%)
Duration of marriage	>5	No	14 (100%)	No	9 (64.3%)
		Yes	0 (0%)	Yes	5 (35.7%)
	5-10	No	17 (100%)	No	3 (17.6%)
		Yes	0 (0%)	Yes	14 (82.4%)
	<10	No	25 (62.5%)	No	23 (54.5%)
		Yes	15 (37.5%)	Yes	17 (42.5%)

Table 4: Changes in patients' sexual function and their sex partner regarding ASEX and HADS questionnaires

Test type		The beginning of the study	End of study	P-value
Arizona (Mean \pm SD)		13.26 \pm 4.1	15.43 \pm 4.6	<0.001*
HADS (Mean \pm SD)	Anxiety	19.28 \pm 2.4	19.82 \pm 3	0.14
	Depression	16.04 \pm 2	16.38 \pm 2.1	0.39

*P <0.05

In addition, the rate of sexual dysfunction in patients younger than 40 years prior to bone marrow transplantation was as follows: 36 (90%) had no sexual dysfunction and 4 (10%) had the disorder, whereas 18 patients (45%) did not develop this disorder after transplantation and 22 patients (55%) developed this disorder. The rate of sexual dysfunction in patients over 40 years after bone marrow transplantation was as follows: 20 patients (64.5%) had no sexual dysfunction and 11 patients (35.5%) had sexual dysfunction. 17 patients (54.8%) did not have sexual dysfunction after bone marrow transplantation and 14 patients (45.2%) had this disorder. The rate of sexual dysfunction in patients based on age at marriage less than 20 years was as follows: 15 (55.6%) had no sexual

dysfunction and 12 (44.4%) revealed this disorder, while the 10 (37%) did not have sex after bone marrow transplantation and 17 (63%) exhibited this disorder. The rate of sexual dysfunction in patients based on marriage age more than 20 years was as follow: After bone marrow transplantation, 25 (56.8%) had no sexual dysfunction and 19 (43.2%) showed this disorder. Rate of sexual dysfunction in patients according to wanted and unwanted marriages prior to bone marrow transplantation: 50 (76.9%) were unaffected and 15 (23.1%) had this disorder. Thirty (46.2%) patients had no sexual dysfunction after transplantation and 35 (53.8%) had this disorder. The rate of sexual dysfunction in patients based on unwanted marriage before bone marrow transplantation was as

follows: 6 patients (100%) did not have sexual dysfunction and 5 patients (83.5%) did not have sexual dysfunction after transplantation and only one patient (16.7%) developed this disorder.

In the present study, ASEX and HADS questionnaires were used to evaluate the rate of change in sexual function of patients and their partners. The results were compared before and after bone marrow transplantation using Wilcoxon nonparametric test in Table 4. At the end of the study and after 6 months, couples' sexual desire declined. According to the results, scores on the ASEX and HADS

questionnaires, this change was significant in the ASEX questionnaire score and non-significant in the HADS questionnaire score.

The study also examined the scores of patients and their sex partners separately, the results of which are presented in Table 5. The results of the changes in the scores of the ASEX and HADS tests showed that the sexual desire in patients and their partner was significantly decreased after 6 months based on the ASEX questionnaire ($P < 0.05$).

Table 5: Comparison of changes in scores of ASEX and HADS tests based on patient group and sex partner

Participant	Test type	The beginning of the study	End of study	P-value	
patient	Arizona Mean \pm SD	14.32 \pm 4.3	17.1 \pm 5.1	0.001*	
	HADS Mean \pm SD	Depression	19.28 \pm 2.8	19.48 \pm 3.2	0.27
		Anxiety	16.08 \pm 2.3	16.74 \pm 2.2	0.6
Sexual partner	Arizona Mean \pm SD	12.2 \pm 3.7	13.69 \pm 3.4	0.015*	
	HADS Mean \pm SD	Depression	20.08 \pm 1.8	20.56 \pm 2.6	0.35
		Anxiety	16 \pm 1.6	16.72 \pm 1.9	0.07

*P <0.05

Table 6: Correlation coefficient of ASEX and HADS test score characteristics with demographic characteristics

Test type		Age	Duration of marriage	Level of Education	marriage age
Arizona (baseline)	The correlation coefficient	-0.041	0.058	-0.041	-0.322**
	P-value	0.688	0.568	0.647	0.001
Arizona (end of study)	The correlation coefficient	-0.162	-0.001	-0.103	-0.164
	P-value	0.107	0.991	0.377	0.102
Depression (Baseline)	The correlation coefficient	0.028	-0.171	0.112	0.318**
	P-value	0.783	0.089	0.269	0.001
Depression (end of study)	The correlation coefficient	-0.01	0.018	0.098	0.043
	P-value	0.922	0.856	0.332	0.674
Anxiety (baseline)	The correlation coefficient	0.21*	0.137	0.137	0.073
	P-value	0.036	0.1	0.085	0.469
Anxiety (end of study)	The correlation coefficient	0.054	0.211	-0.104	0.186
	P-value	0.592	0.35	0.302	0.064

Another assessment on questionnaire data was conducted to compare the scores of the exams between the two groups of patients and their sex partners at the beginning and end of the study. The results of this study using Mann-Whitney test revealed that the ASEX score was significantly higher in the patient group before and after the 6-month follow-up ($P < 0.05$).

In the HADS questionnaire, scores of patients and their sexual partners was found to be increased after transplantation than before, which was not significant in both groups. Patients' scores were significantly lower than those of the sex partner group ($P < 0.05$) and the anxiety and depression subgroups had no significant differences at the beginning and end of the study ($P > 0.05$).

Another aim of this study was to investigate the factors affecting the sexual function of patients undergoing bone marrow transplantation and their sexual partner. Sexual abnormalities were assessed for correlations based on demographic data such as age, duration of marriage, number of children and level of education using chi-square and Spearman tests. Marriage age was inversely correlated with ASEX test score. Furthermore, a significant and significant correlation was found between depression scores based on HADS questionnaire, which is shown in Table 6. This means that increasing marriage age was significantly associated with the downward trend of the ASEX test score. Moreover, with the increase in depression and anxiety, the ASEX test score also increased directly. Similar results were found for the correlation of test scores with demographic characteristics of patients and sex partners.

Other goals of the study were to compare each of the ASEX test subgroups in the two patient and sex partner groups in order to identify more aspects of sexual arousal. Since correlation coefficients are merely a criterion for determining the linear correlation between two variables, regression method needs to be used to determine the effect of each demographic variable on sexual function of patients and their sexual partner.

Furthermore, since the dependent variable in this study is discrete, therefore, binary logistic regression (if one has sex disorder: 1 and if one does not have sex disorder: 0) was applied. Estimates of coefficients of demographic variables and their relationship with sexual function of patients and their sexual partners are presented in Tables 7 and 8, respectively. According to the results of Table 7, among the demographic variables, only age and marriage age are significant. In addition, the positive age coefficient means that increasing the age of patients is capable of enhancing the probability of sexual dysfunction after transplantation. In other words, for one-unit increase in the age of patients after transplantation, the log odd of sexual dysfunction in patients increased by 0.026 after transplantation. Additionally, the negative coefficient of marriage age indicates that increasing the age of marriage after transplantation reduces the probability of sexual dysfunction. In other words, by one-unit increase in the age of marriage after transplantation, the log odd of sexual dysfunction was reduced by 0.043 in patients after transplantation.

Table 7: Relationship between demographic variables and sexual function of patients after transplantation using binary logistic regression

Variable	Exp	P-value	Wald	standard error (S.E)	Coefficient (log odd)
age*	1.026	0.042	4.877	0.093	0.026
Level of education					
Illiterate or less than academic	1.239	0.121	0.927	0.349	0.114
Academic	0.923	0.28	0.851	0.402	-0.072
Job					
Employed	1.113	0.171	0.956	0.266	0.107
Unemployed or retired	1.005	0.207	0.119	0.412	0.005
* marriage age	0.958	0.018	6.241	0.051	0.043-
Duration of marriage	1.006	0.368	0.277	0.104	0.006
Constant	4.669	0.000	13.907	1.118	-1.541

As indicated in Table 8, among the demographic variables, only the age of marriage of patients after sexual transplantation was found to be significant and inversely related to sexual dysfunction. As a matter of fact, by one-unit increase in marriage age of patients after transplantation, the log odd of sexual dysfunction is reduced by 0.059 in patients after transplantation.

Table 8: Investigation of the relationship between demographic variables and sexual performance of patients' partners after transplantation using binary logistic regression.

Variable	Exp	P-value	Wald	standard error (S.E)	Coefficient (log odd)
age	1.007	0.198	0.452	0.169	0.007
Level of education					
Illiterate or less than academic	1.086	0.303	0.265	0.371	0.083
Academic	1.002	0.4469	0.492	0.513	0.002
Job					
Employed	1.369	0.296	0.718	0.219	0.314
Unemployed or retired	1.007	0.201	0.219	0.365	0.007
* marriage age	0.943	0.013	7.152	0.033	0.059-
Duration of marriage	1.005	0.497	0.181	0.132	0.005
Constant	5.618	0.000	16.427	1.151	1.726-

DISCUSSION

In recent years, bone marrow transplantation has led to the recovery of many non-hematologic malignancies resulting in increased life expectancy of many of these patients, although it has some early and late complications[23, 24]. Various studies have reported that bone marrow transplantation can significantly decrease sexual activity in both sexes, and approximately half of people experience some degree of sexual dysfunction after bone marrow transplantation[25]. Therefore, we investigated sexual dysfunction before and after bone marrow transplantation in patients undergoing bone marrow transplantation.

The results of this study showed that despite the change in the severity of anxiety in these patients and their sexual partners during the study, the rate of sexual dysfunction in patients and their sexual partners increased significantly. Analysis of the subgroups of sexual dysfunction revealed that orgasmic dysfunction, erectile dysfunction, and sexual arousal in ASEX were significantly lower than other subgroups in the ASEX questionnaire. The correlation of Arizona and HADS test with demographic characteristics of patients showed a significant and inverse relationship between marriage age and ASEX test score, and there was a significant and correlation between demographic characteristics and depression score in HADS questionnaire. The results of this study revealed a significant increase in the rate of sexual dysfunctions in patients and their sexual partners. These results were in line with the results of Noerskov et al in 2016, which reported that sexual dysfunctions significantly increased after bone marrow transplantation in male and female patients[18]. Humphreys et al., 2007, and Dyer et al., 2016, also found similar results, suggesting an increase in sexual dysfunctions in men and women after bone marrow transplantation[26, 27]. Recent studies have shown that the incidence of psychiatric disorder in people undergoing bone marrow transplantation is about two times higher than in the general population. Patients undergoing bone marrow transplantation often have concerns such as recurrence of disease and the likelihood of their failure to return to function after bone marrow transplantation[28-30]. Psychological disorders that these people experience after

bone marrow transplantation include adaptive disorders, memory disorders, emotional distress, decreased self-esteem and overall life satisfaction. Data from recent studies have shown that timely therapeutic interventions to reduce some of the psychological complications after bone marrow transplantation can improve sexual function in these patients[27]. The results also showed a high prevalence of depression and anxiety among bone marrow transplant candidates before and after the transplant. The results of this study were consistent with the results of other studies by other researchers such as Noerskov et al.[18]. Another study by Gruber and colleagues showed a significant correlation of anxiety, and emotional stress, with sexual dysfunction[25], which was consistent with our study. In a study by Humphreys et al., Depression and anxiety were identified as influencing factors on the incidence and severity of sexual dysfunctions, which, to a large extent, can restore sexual function in patients after bone marrow transplantation[26]. This study compared the effect of demographic characteristics on the rate of sexual dysfunction in patients and their sexual partners. The results showed a significant relationship of demographic characteristics of marriage age and depression with prevalence of sexual disorders. These results are in contrast to other studies that have investigated the effect of demographic characteristics on the incidence of sexual disorders in bone marrow transplant patients, suggesting that the association between the severity of depression and anxiety as well as the gender of patients may influence the incidence and severity of sexual dysfunctions. But other demographic factors had no significant relationship with the incidence of sexual dysfunctions[18, 25, 26].

On the other hand, some research findings showed the relationship between sexual and marital satisfaction that have implications for patients' sexual quality[31].

addressing couples' unique transitional needs in marital life

Among the strengths of this study include: similar study has not been conducted in Iran and shows the results in an Eastern Islamic culture. In this study, in addition to patients receiving bone marrow transplant in their sexual partner, sexual disorders have been studied. Along with the strengths, this study has many significant limitations. First,

there was a almost small sample of mainly white patients who were receiving their care at a single transplant center, hence the generalization of results to other care centers and the population is potentially limited. Second, although the data of our study are hopeful, the lack of a control group confined our capability to conclude decisively that improvements in sexual function were not simply due to time. Furthermore, another of the limitations of this study is the lack of long-term follow-up.

CONCLUSION

Overall, this study showed that bone marrow transplantation not only increases sexual dysfunction in patients, but also cause these dysfunctions in their sexual partner. It seems that this complication can be prevented through various methods, including medication and psychiatric support to reduce depression and anxiety as important causes of sexual dysfunctions.

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