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Cancer and infertility: psychosocial aspects in young women undergoing ovarian tissue cryopreservation

Abstract

Objectives: The main objective of this study is to analyze the psychosocial impact that causes in young women with cancer, the possible loss of their fertility caused by the treatment of their disease, and to analyse their attitudes toward the intervention of extraction and ovarian tissue cryopreservation which is submitted to preserve their fertility, and identify predictors of greater emotional distress.

Methods: This study was conducted with a sample of 116 women newly diagnosed with cancer who were to receive gonadotoxic treatments. They were interviewed and completed a series of instruments (BSI-18, EMASP, COPE).

Results: The level of concern about their possible loss of fertility was high (8.06 out of 10) but undergoing OTC relieved their concern to 97% of the sample. Most of them preserved their fertility for having children and for not suffering an early menopause. Generally it is the oncologist who informs on this effect. The levels of emotional distress were low. The social support perceived was high and the coping strategies most commonly employed were Cognitive Coping, Search of Support and Active Coping. An increased use of the strategies search of support and religion accompanied to a low use of cognitive strategies and less support perceived will increase the levels of emotional distress.

Conclusions: The possible loss of fertility concerns young women newly diagnosed with cancer. However the level of emotional distress experienced is not clinically significant. Having cryopreserved ovarian tissue alleviates the level of concern.

Keywords: cancer, fertility, preservation, young women, psychosocial aspects, distress, oncofertility

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Abbreviations: OTC, ovarian tissue cryopreservation; COPE, cognitive coping; EMASP, equation were global social support

Introduction

Cancer affects increasingly young women who are still in reproductive age, but the advancement in treatments have improved the rates of survival among younger people.[1] However, these treatments can cause significant side effects; one of the common side effects is the premature ovarian failure and infertility.[2] This fact, together with the delay in the age at which women become mothers, implies that a significant proportion of cancer survivors do not have children and want them, but they can face serious difficulties to achieve a pregnancy. In general, psychological distress generated by infertility in women has been widely documented in literature. In fact, those who have fertility problems often experience it as an emotionally painful experience and as a stressful situation.[3,4,5] Even more, some studies have shown that women with infertility have significantly higher levels of depression and twice the prevalence of depressive symptoms than fertil women.[6,7] But when the cancer is the cause of reproductive problems, emotional reactions may be more intense, given that the problem is compounded by the threat of the disease.[8]

Although this is a relatively new area of study, there are already some publications focusing in this issue. Most results agree that the loss of fertility as a result of cancer treatment has important psychosocial implications in young people.[9–20] In fact, fertility problems derived from cancer treatments are among the main concerns of young cancer survivors.[14,17,18,21,22,23] Moreover the fact that the number of young cancer survivors is increasing, appeals to the need to understand and analyze the main psychosocial factors surrounding this issue. On the other hand, recently, some strategies have been developed in order to preserve reproductive function in women with cancer, like ovum cryopreservation, cyopreservation of embryos or ovarian tissue cryopreservation (OTC).[24–35] However, there have been few studies from a psychological perspective. In this context, this work analyses the psychosocial repercussions caused by the possible loss of fertility associated with cancer treatment in a sample of young women recently diagnosed with cancer who are going to receive Ovarian Tissue Cryopreservation (OTC). Most studies in this topic have been conducted with cancer survivors,[10–23] therefore we considered more suitable to work on a sample of women recently diagnosed with cancer. Our study raises two specific objectives:

I. To analyze the information women have received about the possible effects of the cancer treatment on their reproductive capacity, their desires and attitudes towards motherhood, and their motivation and attitudes towards the intervention of extraction and cryopreservation of ovarian tissue they are going to receive.

II. To evaluate various psychological variables relevant in this context and the relationships between them, specifically, emotional distress, coping strategies and social support. Both coping strategies and social support have been confirmed in the Psycho-oncology literature as significant predictors of emotional distress and quality of life of cancer patients[36–40] so presumably also have an important role in the context of the Onco-fertility; the few studies published to date show evidence in this sense.[10] Moreover, in the field of human reproduction, both variables have also been related with the emotional distress associated with infertility in the general population.[41–44]

Methodology

Design and procedure

This study was conducted with patients from the Hospital Peset of Valencia and from the Hospital La Fe of Valencia in Spain. Both are pioneer centres in applying protocols of extraction and cryopreservation of ovarian tissue in Spain, in order to preserve fertility. Women of reproductive age and adults (≥18 years old), newly diagnosed with cancer who were to receive gonadotoxic treatment and were to undergo ovarian tissue cryopreservation (OTC) to preserve their fertility was the sample of this study. All those cancer patients who attended the Hospital Peset to undergo that intervention between May 2007 and September 2010 and those who attended between January 2011 and September 2012 to the Hospital La Fe with the same purpose were the initial sample. Immediately before or after undergoing OTC, the psychologist responsible for the research invited them to participate voluntarily in the study, explaining the general objectives of the study. Those who agreed to participate in the study filled out the written informed consent. Women were identified only with a study number; the list pairing study number and names was kept confidential and destroyed after completion of data collection.

Assessment

A trained psychologist conducted a semi-structured interview which assessed demographic data, the degree of concern about the effects of treatment on their reproductive capacity, the information received, attitudes toward motherhood and motivations and attitudes towards OTC. This interview was developed specifically for this study using as reference the instrument created by L. Schover and employed in several researches.[8,45,46] Several instruments for evaluating psychological variables relevant in this context were also administrated: the BSI-18 (Brief Symptoms Inventory 18 Test)[47] assessing psychological distress by 18 items that provide a global score of emotional distress (α=0.88)[1] and three subscales which are depression (α=.73)*, anxiety (α=.76)* and somatization (α=0.76)*; the EMASP (Escala Multidimensional de Apoyo Social Percibido)[48] which assesses through 12 items the global social support perceived (α=.76)* and social support from the family (α=.80)*, from the friends (α=.82)* and from relevant people (α=.90)* and the COPE (COPE Inventory)[49] to indentify the type of coping strategies employed. The subscales of this instrument did no got satisfactory reliability indices in our sample so we proceeded to factorize the instrument and the new defined subscales were considered for this study: active coping (α=.85)2*, search of support (α=.80)*, cognitive coping (α=.76)*, religion (α=.85)*, humor (α=.85)* and alcohol or drugs (α=.90)* (citar mi tesis).

Sample

Finally the sample was composed of 116 women of the 122 who were initially invited to participate, between 18 and 40 years old (average age 30.55) diagnosed with different type of cancer (Table 1). 56% (N=65) of the sample was married or in a stable relationship, 41% (N=47) were single and 3% (N=4) were separated or divorced. 97% (N=112) of the sample were Spanish and 3% (N=4) of other nationalities (Portuguese, Bulgarian, Peruvian and British). The educational level of the sample was medium-high and 53% (N=61) had universities studies, 37% (N=43) had secondary or high school studies and 10% (N=12) had primary education. 88% (N=102) of the sample had no biological children while 12% (N=14) had at least one biological child. Clinical and sociodemographic data of the sample are shown in Table 1.

Table 1 Distribution of the sample by clinical and sociodemographic characteristics (N= 116)

Type of cancer	**N**	**%**
Breast Cancer	78	67
Hodgking lymphoma	22	19
Non Hodgking lymphoma	5	4
Bowel cancer	2	2
Osteosacroma	2	2
Ovarian tumor	1	1
Adrenal cancer	1	1
Leukemia	1	1
Others	4	3
Age	**Range**	**Mean**
	18- 40	30.55 (SD= 5.22)
Marital status	**N**	**%**
Married/ stable couple	65	56
Single	47	41
Separated/ divorced	4	3
Nationality	**N**	**%**
Spanish	112	97
Other countries	4	3
Educational level	**N**	**5**
Universities studies	61	53
Secondary/ high school	43	37
Primary education	12	10
Employment situation	**N**	**%**
Working	93	80
Studying	13	11
Unemployed	6	5
Housekeeper	1	1
Others	3	3
Children	**N**	**%**
With children	14	12
Without children	102	88

Statistical analysis

We performed descriptive and inferential analysis of the evaluated variables. The statistical significance level for analysis was p≤.05. The analyses were carried out using the statistical package SPSS 20.0 and QS 6.1.

[1]Internal consistency obtained by the scale in the study sample.

Results

Information received about the possible loss of fertility associated with cancer treatment

Various issues related to the information process were analysed. Regarding the source of information, 84.5% (N= 98) of the sample obtained information about the possible loss of fertility due to cancer treatment from their oncologist or haematologist, 5.2% (N=6) were informed by the family doctor or general practitioner, 25.9% (N=30) got this information from a medical specialist (the most frequently mentioned were surgeons and gynaecologists), 8.6% (N=10) obtained this information from a family member, 6.9% (N=8) were informed by another patient and 12.9% of the sample (N=8) also received information about it through the media, such as magazines or internet. We emphasize these categories are not mutually exclusive, so a patient could have indicated more than one source of information. The degree of patients satisfaction with the information received was scored with an average of 7.66 out of 10, but 41.4% (N=48) of the sample said that they would change the information they had received or the type of information received. Mainly those women would like to receive more information about side effects of cancer treatment and more time to discuss it, more explanations of all the options to preserve fertility, and more coordination between oncologist and gynaecologist, among others.

Degree of concern about possible infertility Motivations and attitudes towards OTC

Women rated the degree of concern about the effects of treatment on their reproductive capacity with a score of 8.09 over 10. Having cryopreserved their ovarian tissue decreased the level of concern in 97% (N=112) of the sample. Women showed high motivation in their choice of OTC, it was scored with a 9.4 over 10. The main reasons to decide undergo OTC were having children and having the opportunity to decide in the future (84.75%), ensure their fertility in the future (6.11%) and not suffer an early menopause (6.11%).

Motivations and attitudes towards motherhood

Women valued having children (8.66 out 10) and to restore hormone function (8.06 out 10) as very important. Considering the desire of having children in the future, 67.2% (N=78) of sample said to be sure that she wanted to have a child in the future, 28.4% (N=33) would probably want one and 4.3 (N=5) was not sure. However, 30% (N=34) considered that having the disease and knowing the effect of the treatment on their fertility had increased their desire to have children, 66% (N=77) considered that it had not altered their desire of having children and 4% (N=5) felt that the disease had decreased their desire to have children. Thus, 28% (N=32) believed that women without children were not complete. As alternative ways to biological motherhood they had a more positive attitude towards adoption (58% strongly agree) than to ovum donation (23% strongly agree).

Levels of emotional distress, social support and coping strategies

The descriptive results of these variables are shown in Table 2. The results of the BSI-18 indicated low levels of psychological distress. In fact, only 10 women (8.7% of the sample) obtained scores into the clinical range following the criteria of the instrument´s author.[47] The results of the EMASP reported high levels of social support perceived in the total scale and in the three subscales (family, friends and relevant persons), considering the range of possible scores on scales (67,98 out 72 in Total score and almost 23 out of 24 in the three subscales). The COPE showed that the coping strategies most used by women in our sample were Cognitive Coping, Search of Support and Active Coping; while the Humour and Religion scales were moderately employed and Alcohol and Drugs were the least used strategies.

Table 2 Descriptive datas of variables (N= 116)

BSI -18	**Mean**		**S.D.**	**Range of scale Scores**
Global score	8,86		8,92	0 - 72
Somatization	1,60		2,79	0 - 24
Depression	3,27		3,54	0 - 24
Anxiety	3,99		3,87	0 - 24
EMASP	**Mean**		**S.D.**	**Range of scale scores**
Global score	67,98		5,03	Dec-72
Family	22,29		2,64	24-Apr
Friends	22,84		2,84	24-Apr
Relevant people	22,85		2,68	24-Apr
COPE	**Mean**	**Weighted mean by number of items (1-4)**	**S.D.**	**Range of scale scores**
Support	39.02	3.25	6.73	12 – 48
Active Coping	35.6	2.97	7.04	Dec-48
Religion	6.89	1.72	3.59	4 – 16
Cognitive Coping	26.88	3.36	4.17	Aug-32
Humor	7.53	1.88	3.54	4 – 16
Alcohol or drugs	4.13	1.03	0.47	4 – 16

Relationships between emotional distress, social support and coping strategies used

After correlation analysis between all the psychological variables evaluated through standardized instruments we did regression analysis in order to determine which variables, specifically what coping strategies and level of perceived social support, play an important role in predicting emotional distress. Coping scales assessed by the COPE and social support assessed by the EMASP that had shown significant correlations with relevant criteria will be used as predictors in the regression analyses. Table 3 shows significant correlations and significant tends between all the variables and Table 4 the regression analysis realized. Considering the Global score of BSI-18 as dependent variable, the resulting function included as significant variables the scales of Search of Support (β=.34) and Religion (β=.22) of the COPE instrument, positively associated with emotional distress, and Overall Social Support Perceived (of the EMASP) (β=-.29) and the Cognitive Coping scale of the COPE (β=-.33) negatively associated with emotional distress. The variance explained by these variables was 30%.

Also we made regression analysis for each subscale of the BSI-18 (somatization, depression and anxiety). In the case of Somatization subscale, regression function included as significant predictors the

use of Religion as a positively associated coping strategy (β=.16) and social support from Relevant People (β=-.23) in the negative sense, and both predictors accounted 6% of the variance. In the case of regression analysis for Depression and Anxiety subscales of BSI-18, the same independent variables were included in the regression equation and the results of both regression analysis were also the same. The independent variables in the equation were Global Social Support (EMASP) and Cognitive Coping (COPE) with negative association with dependent variable, and Religion and Search of Support coping strategies (COPE) with positive association. All these variables contributed significantly to the regression equation and explained the 36% of the variance for depression and the 25% in the case of anxiety.

Table 3 Correlations between the variables evaluated (N= 116)

	Somatization (BSI-18)	Depression (BSI-18)	Anxiety (BSI-18)	Total BSI-18	Family (EMASP)	Friends (EMASP)	Relevant People \ (EMASP)	Total EMASP	Support (COPE)	Active Coping (COPE)	Religion (COPE)	Cognitive Coping (COPE)	Humor (COPE)	Alcohol (COPE)
Somatizatization (BSI-18)	1													
Depression (BSI-18)	0,47**	1												
Anxiety(BSI-18)	,67**	,75**	1											
Total BSI-18	,79**	,87**	,94**	1										
Family (EMASP)					1									
Friends (EMASP)		-47	-0,2	-0,29		1								
Relevant people (EMASP)	-0,19			-,160	,21*		1							
Total EMASP		-0,37	-0,23	-0,29	,70**	,66**	,59**	1						
Support (COPE)		,23*	,22*	,22*					1					
Active Coping (COPE)									,59**	1				
Religion (COPE)	,22*	,29**	,32**	,32**					,21*		1			
Cognitive Coping (COPE)		-0,31	-0,25	-0,29		,180		,21*	,35**	,35**		1		
Humor (COPE)													1	
Alcohol (COPE)													,19*	1

**.Significant correlation at the level 0,01 (bilateral).

*.Significant correlation at the level 0,05 (bilateral).

Table 4 Regression analysis. Dependent variables: General Distress and subscales (BSI-18). Predictor variables: coping strategies (COPE) and social support (EMASP) (N=116)

Total BSI-18	**R^2=.33**	**R^2c=.30**	**F=13.29**	**p=.000**	
	β		t		p
Constant					
Global Social Support Perceived (Total EMASP)	-0.29		-3.53		0.001
Search of Support (COPE)	0.34		3.89		0
Religion (COPE)	0.22		2.78		0.006
Cognitive Coping (COPE)	-0.33		-3.87		0
Somatization (BSI-18)	**R^2=.08**	**R^2c=.06**	**F=4.88**	**p=.009**	
		β		t	p
Constant					

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Table Continued

Relevant people (EMASP)		-0.23		-0.02	0.05
Religion (COPE)		0.16		2.33	0.02
Depression (BSI-18)	**R^2=.39**	**R^2c=.36**	**F=17.62**	**p=.00**	
		β		t	p
Constant					
		-0.36		-4.71	0
Global Social Support Perceived (Total EMASP)					
Search of support (COPE)		0.33		4.65	0
Cognitive Coping (COPE)		-0.36		-4.36	0
Religion (COPE)		0.18		2.32	0.02
Anxiety (BSI-18)	**R^2=.27**	**R^2c=.25**	**F=10.31**	**p=.00**	
		β		t	p
Constant					
Global Social Support Perceived (Total EMASP)		-0.23		-2.73	0.01
Search of Support (COPE)		0.32		3.51	0
Cognitive Coping (COPE)		-0.3		-3.34	0
Religion (COPE)		0.23		2.77	0.01

Discussion

Our study verifies that the possible loss of fertility is a great concern for young women diagnosed with cancer, coinciding with the results found in other studies.[14–18] However, a large majority (97%) of our sample said that undergoing OTC alleviated this concern. This result also coincides with those found in other studies, which concluded that to undergo techniques for fertility preservation has positive effects on the attitudes of patients coping with cancer.[50–54] In fact, survivors of breast cancer who had preserved their fertility were much less concerned about their future fertility than those who had not preserved it.[15] One of the advantages of cryopreservation of ovarian tissue compared to other alternatives for preserving fertility, is that not only allow having children but also can restore the hormonal ovarian function. Thus, among the main reasons why the women of our study decided to cryopreserve ovarian tissue was not only to be able to have children in the future but also not have an early menopause. In fact, when we evaluated separately the importance attached to have a child, and moreover, to restore hormonal function after treatment against cancer, we saw that both issues were very important for them and got high mean scores: 8.66 (SD=1.72) and 8.06 (SD=2.23) respectively. The cessation of hormone function is associated with vasomotor, skeletal, genitourinary and cardiovascular problems, and may be accompanied by specific symptoms such as hot flashes, vaginal dryness, sexual dysfunction, weight gain, psychological distress and possible cognitive impairment.[55–58] In fact, there is evidence that young women, who because of their cancer diagnosis suffer early menopause, have shown a poorer quality of life and poorer health perception.[9,59] This could explain why women in our study gave importance to this issue.

The degree of concern that caused knowing the possible loss of fertility due to treatment of cancer, has been particularly associated with the desire to have children in the future and having children or not at the time of diagnosis.[17,23,45,60,61] In our work we assessed the desire to have children in the future and this was high. However, the results of several studies suggested that this desire to become a mother is not affected by the diagnosis of cancer, and again the results of our study are consistent with these data.[10,45,46] As an alternative to biological maternity, patients in our study showed a more favorable attitude towards adoption than to ovum donation. These results are in line with those found by other authors who have also seen a positive attitude towards adoption and preference for this alternative compared to donor eggs or sperm.[8,12,23,45]

Moreover, studies agree that is very important for cancer patients to receive information about both, the possible impairment of reproductive capacity and early menopause, and this information is considered more important in the case of those younger women without children at the time of diagnosis and with plans to have children in the future.[61–64] In our study we have seen that is the oncologist who usually informs about this, coinciding with those reported in other studies.[15,45,60,61,65] The women of our sample are quite satisfied with the information received. However, 41.1% (N=48) of the sample said they would change the mode and type of information they had received

and they suggested, between others, spend more time providing detailed information in this topic as well as about the intervention of OTC, and they also proposed that cancer services should be more informed about this effect and the options for preserving fertility and a higher coordination between oncologists and gynaecologists. These suggestions go in the same line as several published studies. In fact, the study of Corney et al.[16] also contains suggestions of patients in their sample and mostly coincided with those of our patients. In the study of Green, Galvan et al.[39] a high percentage of their sample felt that the information they had received was poor. Something similar was found in the study of Schover et al.[46] where the limited information was a reason for not having preserved and the study of Thewes et al.[62] concluded that it was necessary to improve information to young women with breast cancer on this topic.

There seems to be some consensus in the psychological impact on young women who have been treated for an oncological disease and as a result they have reproductive problems. Carter et al.[12] concluded in their study that women with a history of gynaecological cancer who had lost their reproductive capacity had symptoms of depression, sadness and stress. Specifically 44% of their sample had clinical criteria for depression, and 35% had moderate to severe levels of psychological distress. A few years later, these same authors, with a larger sample of women also with a history of gynaecological cancer Carter et al.[14] found that 77% obtained clinically significant scores of distress due to the loss of their fertility and 6% scores indicating clinical depression. More recently, Penrose et al.[19] with a sample of cancer survivors, found that 56% reported being concerned about this issue and said they had expressed strong emotional reactions to know that side effects and 20% reported having experienced distress.

In our study we evaluated, through standardized instruments, the level of psychological distress by the possible loss of fertility and its relationship with coping strategies and perceived social support. The scores obtained by our sample were low in the Global score of emotional distress and in the three subscales: somatization, depression and anxiety. Our results do not agree with those found in other studies but other results of our study can explain this difference. So, in our study we found that those variables which were associated with increased symptoms of emotional distress were the increased use of coping strategies such as Search of Support and Religion combined with low use of Cognitive coping strategies and low Perceived Social Support. The fact that our sample presented high scores in social support and the coping strategies more employed were essentially active and problem-focused may contribute to the low level of emotional distress manifested, since both variables were associated with better psychological adjustment in cancer patients in general and in specific samples of young women with infertility due to cancer treatment.[10,37,38] Also, the specific characteristics of our sample (high sociocultural level and having preserved fertility), may be contributing to the low levels of emotional distress.

Conclusion

The possible loss of fertility concerns young women newly diagnosed with cancer. However the level of emotional distress experienced is not clinically significant. Having cryopreserved ovarian tissue alleviates the level of concern and it has positive effects on their attitudes to the disease. It is important to emphasize the exploratory character of our study and the need to get new investigations in this area. Despite this and the limitations associated with the characteristics of our sample, we believe that through our results we have achieved to understand a little better the attitudes of our patients to this fact.

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None.

Conflicts of interest

The author declares there is no conflict of interest.

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