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Original article

Fertility concerns, preservation strategies and quality of life in young women with breast cancer: Baseline results from an ongoing prospective cohort study in selected European Centers

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ABSTRACT

Objectives: Most research addressing needs and concerns of young patients with breast cancer (≤40 years) is retrospective. The HOHO European protocol is a prospective multicenter cohort study of young women with newly diagnosed breast cancer, about fertility, psychosocial and quality of life concerns. Here we report the baseline data and focus on predictors of fertility concerns.

Materials and methods: Patient surveys and medical record review were used. The baseline survey included sociodemographic, medical and treatment data as well as questions on fertility concerns and preservation strategies. Subscales from the CAncer Rehabilitation Evaluation System-Short Form (CARES-SF) were administered to measure specific quality of life aspects. Uni- and multivariable modeling were used to investigate predictors of greater fertility concern.

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Results: Among 297 eligible respondents, 67% discussed fertility issues before starting therapy, 64% were concerned about becoming infertile after treatment, and 15% decided not to follow prescribed therapies. Fifty-four percent of women wished future children before diagnosis; of these, 71% still desired biologic children afterwards. In multivariable analysis, not having children was the only patient characteristic significantly associated with fertility concerns at diagnosis. Twenty-seven percent used fertility preservation strategies. Women who received chemotherapy reported greater physical ($p = 0.021$) and sexual difficulties ($p = 0.039$) than women who did not. Women who were married or had a partner reported less psychosocial problems than single women ($p = 0.039$).

Conclusions: Young women with newly diagnosed breast cancer have several concerns, including, but not limited to, fertility. The HOHO European study provides valuable information to develop targeted interventions.

1. Introduction

In developed countries, 5–7% of all breast cancers (BCs) are diagnosed in women ≤40 years [1]. Five-percent of the 114,000 BCs diagnosed in Europe in 1999–2007 occurred in women aged 15–39: the proportion was even higher in Italy, France and UK [2,3].

Despite the overall decrease in BC mortality over the past decades, survival is still lower in young compared with older women and BC remains the leading cause of cancer-related death in this age group. Several factors may contribute to their worse prognosis, e.g. the lack of systematic breast screening and insufficient disease awareness of both patients and physicians, often associated with later diagnoses, and more aggressive disease biology. As a consequence, more aggressive systemic therapies are frequently prescribed, with significant acute and long-term side effects.

Young BC patients experience unique medical and psychosocial issues. In particular, infertility, premature menopause, body image and sexual dysfunction are major concerns and contribute to the higher distress observed in this age group [4]. Since the end of the 20th century, a trend to delay childbearing has been observed in western countries for socioeconomic and cultural circumstances [5], implying that many young BC patients have not completed their families when diagnosed and have significant concerns about treatment-related infertility [6].

Economic impact, job discrimination, children and family care represent other critical features that may also influence their decision-making process [7]. Young patients also experience increased loneliness, lack of connections with other young survivors and more difficulties coping with the impact of their disease on family members, partner and friends [8]. Campbell and colleagues highlighted the need for young patients to receive more information and additional support for treatment-related physical and emotional changes, fertility and menopause issues, personal relationships and work challenges [9]. In their systematic literature review, Howard-Anderson et al. [10] found most studies of young BC patients were retrospective and cross-sectional, reporting associations whose causality was uncertain.

Several studies have reported that only approximately 50% of female cancer survivors received reproductive health counseling. Letourneau et al. [11] found that dedicated counseling regarding fertility and fertility preservation were both correlated to less regret and better quality of life (QoL). In a review of 303 young BC patients, McCray et al. [12] documented that only 26% had a fertility discussion with their doctor. Of these, 89% sought further consultation for fertility preservation. In a recent review, Lambertini and colleagues confirmed that a large proportion of patients facing fertility and pregnancy concerns do not pursue fertility preservation strategies, most likely due to the lack of adequate counseling at the time of treatment decision-making [13].Thus, prospective longitudinal studies are needed to evaluate the interaction between baseline personal characteristics, BC diagnosis and treatment-related factors.

Helping Ourselves, Helping Others (HOHO), the Young Women's Breast Cancer Study (NCT01468246), a North American multicenter prospective cohort study led by Dana-Farber Cancer Institute (DFCI) was designed, in part, to better understand patients' concern about fertility, its impact on treatment decisions and fertility preservation strategies in young women with newly diagnosed BC. The preliminary data on 620 women showed that many women (51%) were concerned about fertility and in 26% these concerns significantly affected treatment decisions including endocrine therapy (ET) adherence. Nonetheless, nearly three quarters of those concerned about fertility at diagnosis did not use fertility preservation strategies [14].

Patient autonomy in the US culture encourages individuals to assume greater responsibility for their own health than in Europe. Limited data are available on ethno-cultural and language differences in health domains and none focuses specifically on young women with BC in Europe [15].

The International Breast Cancer Study Group (IBCSG), in collaboration with DFCI, sought to characterize the experience of BC in a cohort of young European women, focusing especially on fertility concerns and their impact on treatment decision making. Here we present data from the baseline survey (first assessment within 6 months after diagnosis).

2. Patients and methods

IBCSG 43-09 HOHO is the European ancillary study of the project developed at DFCI. It is a longitudinal cohort study of young women with BC in selected institutions in Switzerland and Italy.

Eligibility included: age ≤40 years, Stage I-IV BC diagnosed <6 months before enrollment. Surveys were collected during hospital visits at baseline and then mailed every 6 months for the first 3 years and yearly thereafter for additional 7 years. Yearly medical data included tumor characteristics, treatment details and comorbidity. The baseline survey included sociodemographic data, a modified Fertility Issues Survey (including fertility concerns, preservation measures, outcome and impact on treatment decisions) and a Fear of Recurrence Scale (not included in the present analysis), as described by Ruddy et al. [14].

In addition, the validated CAncer Rehabilitation Evaluation System-Short Form (CARES-SF) was included to assess specific quality of life (QoL) aspects. The CARES-SF is a multidimensional instrument incorporating 6 subscales: *physical* (physical changes and disruption of daily activities caused by the disease); *medical interaction* (problems interacting and communicating with the medical team); *psychosocial* (psychosocial issues, communication and relationship problems, except with partners); *sexual* (problems related to interest and performance of sexual activity); *marital* (problems within a significant marital-type relationship); *miscellaneous* problems, not considered in the present study [16].

Participants rated how much a given problem applied to them during the weeks preceding the completion of the survey, on a five-point scale with 0 representing “not at all” (no problem) and 4 representing “very much” (severe problem). Higher scores indicate therefore more difficulty and thus a poorer QoL.

Due to resource constraints, the present study was not designed as a comparative multiethnic/country survey. The European survey was translated and shortened, with the assistance of the Europa Donna advocacy group of Southern Switzerland, to improve patient engagement.

The associations between fertility concerns (dichotomized as “very or somewhat concerned” versus “a little or not at all concerned”) and the twenty-four socio-demographic factors, tumor characteristics, treatments and fertility-related issues were considered the primary associations of interest.

An absolute difference of 30% of concerned patients across covariate’s levels (e.g. had or not had children before cancer diagnosis) was considered relevant, as previously reported in a web-based survey led by DFCI [17]. To account for both the uneven distribution of patients in each covariate level and the correlation between covariates, the sample size calculation was based on the method proposed by Hsieh et al. [18] for multivariable regression models. The accrual of 300 patients provided 80% power to detect relevant differences. Associations were considered statistically significant with p-value <0.05.

Demographic and clinical characteristics were analyzed using descriptive statistics. The associations between fertility concern and socio-demographic factors, tumor characteristics, treatments and fertility-related issues were evaluated using log binomial regression models, and the relative risk (RR) of being concerned was estimated. Covariates associated with univariable $p < 0.10$, or $RR > 1.20$ or $RR < 0.80$, were then included in a multivariable model.

Differences in the distribution of the CARES-SF subscale scores between socio-demographic and clinical variables were analyzed using T-test. For illustrative purposes, for those CARES-SF subscales, which significantly differed between levels of socio-demographic and clinical variables, we also reported on the percentages of patients who responded to a question (single-item level) with not having this problem at all or a little (scores 0 and 1) versus those who reported at least a fair amount of the problem (scores 2 to 4 ranging from “a fair amount” to “very much”).

All analyses were performed using the SAS software v. 9.4 (SAS Institute, Cary, NC).

3. Results

From July 2009–January 2016, 349 patients were approached in 18 institutions in Italy and Switzerland. Of these, 300 patients were enrolled; 297 baseline surveys were evaluable (207 from Italy and 90 from Switzerland) (Fig. 1).

We report the results of the baseline questionnaire, focusing in particular on fertility and QoL.

Table 1 summarizes patients’ demographics and clinical characteristics. Thirty-two percent of women were aged <35 years, 68% were college educated, 65% were married or in a stable relationship, 59% were employed full-time and 54% had children before cancer diagnosis.

3.1. Fertility concerns

Fertility concerns and steps taken to prevent infertility are summarized in Table 2. One-hundred-sixty-one women (54%) reported they wished future biologic children before their BC diagnosis; of these, 114 (71%) still desired children after diagnosis. At baseline survey, the major concerns of women who desired future children were fear of increasing their personal (32%) or offspring (47%) cancer risk and of not being able to take care of their children in case of disease relapse (38%). When making treatment decisions, 100 women (34%) reported being ‘not at all’ concerned about becoming infertile, 60 (20%) were ‘a little’ concerned, 43 (14%) were ‘somewhat’ concerned and 86 (29%) were ‘very’ concerned. Concerns about fertility did not affect treatment decisions ‘at all’ in 172 (58%) women, affected treatment decisions ‘a little’ in 55 (19%),

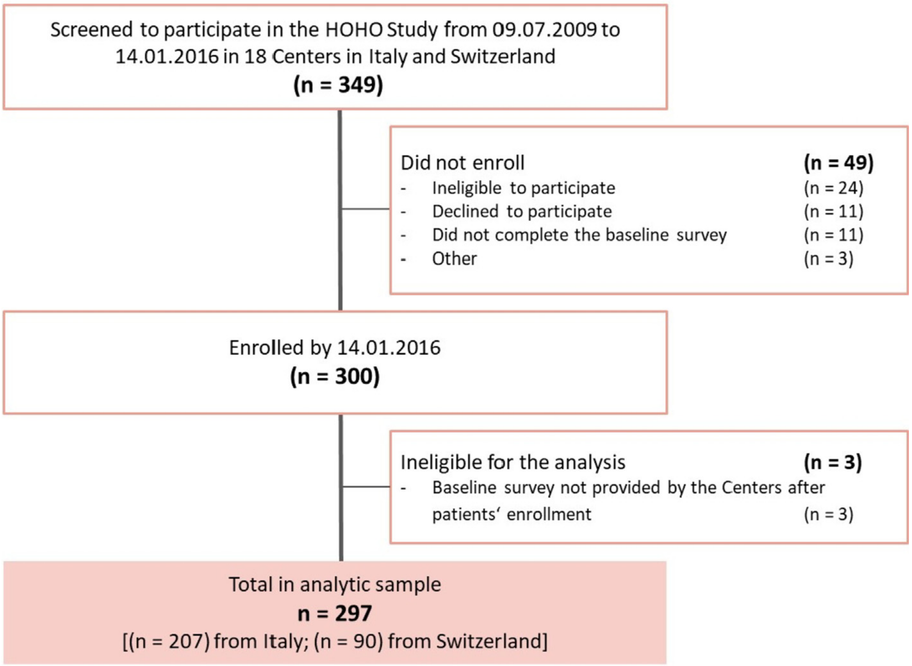

Fig. 1. Study flow diagram of participants.

Table 1
Women's demographic and clinical characteristics (N = 297).

Characteristic	No.	%
Age <35 years	95	32
College educated	201	68
Married or in a significant relationship	192	65
Employed full time	176	59
Financially comfortable	123	41
First-degree relative with breast or ovarian cancer	127	43
With comorbidities[a]	23	7
Received/receiving chemotherapy	173	58
Already receiving endocrine therapy	148	50
Underwent mastectomy	115	39
Pregnant at time of survey	0	0
Pregnant at diagnosis	3	1
Had children before cancer diagnosis	160	54
Never pregnant	119	40
History of miscarriages/stillbirths	40	13
History of therapeutic abortions	33	11
History of infertility treatments before diagnosis	12	4
History of difficulty becoming pregnant	17	6
No longer menstruating at time of survey	119	40
Sexually active since cancer diagnosis[b]	185	62
pT		
1	150	51
2	95	32
3	12	4
4	1	0
X[c]	39	13
pN		
0	139	47
1	84	29
2	19	6
3	18	6
X[d]	37	12
M		
0	287	97
1	10	3
Grade		
1	12	4
2	107	36
3	165	56
Missing	13	4
ER/PR positive	227	76
HER2 positive	75	25

[a] 7 women had thyroid dysfunction, 2 endometriosis, 2 diabetes, 7 suffered from depression, 3 had other tumors, 1 had diabetes and thyroid dysfunction, 1 suffered from depression and thyroid dysfunction.

[b] 26 missing information.

[c] 32 women received neoadjuvant treatment, 7 were metastatic at diagnosis.

[d] 30 women received neoadjuvant treatment, 7 were metastatic at diagnosis.

'somewhat' in 23 (8%) and 'a lot' in 37 (12%). One-hundred-ninety-eight (67%) women reported they had discussed fertility with their physicians before starting therapy. Seventy-nine women (27%) took special steps to lessen the chance of infertility: 4 underwent embryo cryopreservation, 18 oocyte cryopreservation, 6 ovarian tissue cryopreservation and 72 received GnRH agonists (GnRHa) during adjuvant chemotherapy.

Table 3 shows regression analysis results evaluating the associations between being concerned about fertility and patient/disease characteristics. In univariable analysis, age <35 years (RR = 1.47), college education (RR = 1.40), being employed fulltime (RR = 1.64), having comorbidities (RR = 1.27), receiving ET (RR = 1.50), having a history of infertility treatments before diagnosis (RR = 1.73), and absence of menses at time of survey (RR = 1.36) were positively associated with being concerned about fertility, while being married or in a stable relationship (RR = 0.50) and having children prior to diagnosis (RR = 0.33) was negatively associated with fertility concerns. In multivariable analysis, having children was the only variable associated with fertility concerns: the likelihood of being concerned about fertility was 25% lower in parous women compared with nulliparous women (RR = 0.75, p = 0.001).

The descriptive comparison between the published data of the US cohort [12] and the European cohort showed several differences (Table 4). Almost 70% of women in both cohorts discussed future fertility with their doctors at diagnosis whereas fertility concerns, desire for future pregnancy, both before disease onset and at time of survey, and steps to reduce infertility were more common in the European cohort. Fertility concerns affected treatment decisions more frequently in European women, who were also more worried about a possible relapse affecting their ability to care for future children [19].

3.2. Quality of life

Differences in the distribution of each of the five CARES-SF domain scores (physical, medical interaction, psychosocial, sexual and marital) between socio-demographic and clinical variables are listed in Table 5.

Compared to women who did not receive chemotherapy, women treated with chemotherapy reported greater physical (p = 0.021) and sexual (p = 0.039) difficulties.

In particular, among the 173 women treated with chemotherapy, 54% (scores above 1) reported they no longer had the energy they normally had, compared to 35% of the 124 women not treated with chemotherapy. Fifty-seven percent of women treated with chemotherapy and 37% of women not treated with chemotherapy found cancer or its treatment to interfere with their ability to work, 37% and 32%, respectively, had difficulty doing household chores, and 39% and 34%, respectively, had difficulty planning daily activities. Moreover, 40% of the women treated with chemotherapy and 33% of women not treated with chemotherapy, did not feel sexually attractive, and 35% and 23%, respectively, were not interested in having sex. Among those treated with chemotherapy who were sexually active (112 of 173), 52% reported the frequency of sexual activity had decreased, compared to 35% of women who did not receive chemotherapy.

Finally, women who were married or had a stable partner reported less psychosocial problems (p = 0.039, Table 5) than single women. Between the 105 single women, 43% reported not feeling comfortable with changes of their body, 43% had difficulty sleeping and 35% had difficulty asking friends or relatives to do things for them. The corresponding proportions among the 192 women who were married or had a stable partner were 32%, 25% and 20%, respectively.

4. Discussion

Most literature on the impact of BC diagnosis and treatment in young women is retrospective. HOHO Europe is the first prospective study conducted in Europe of specific psychosocial and QoL concerns young women face during their BC journey. Women were enrolled in Italy and in Switzerland, representing therefore only a selected subset of European patients. HOHO Europe also aimed to identify possible differences in attitudes and behaviors compared with US patients.

When looking specifically at fertility concerns, our data confirm that a significant proportion of women (54%) had not completed their families when diagnosed and a substantial subset of these (71%) still desired future biologic children following BC. The questionnaire did not address the role of health professionals in reassuring or discouraging pregnancy after the disease, but the results of a survey conducted during the 3rd ESO-ESMO Breast Cancer in Young Women International Conference (BCY3) and the 15th St.

Table 2
Fertility concerns, decision making and strategies.

Characteristic	No.	%
Before breast cancer diagnosis, wished to have biologic children in future:		
No[a]	136	46
Yes[b]	161	54
At time of survey, wished to have biologic children in future	120	40
If no before breast cancer diagnosis[a]	6	4
If yes before breast cancer diagnosis[a]	114	71
Felt pressured by partner, family or friends to have children (somewhat or a lot)	17	6
Felt pressured by partner, family or friends to not have children (somewhat or a lot)	10	3
If wanted more children, concerned about: (some patients indicated >1 answer)	*n* = *120*	
Caring for them if cancer recurred	45	38
Pregnancy would increase risk of recurrence	38	32
Children having increased risk of developing cancer	56	47
At time of decision making about treatment, concerned about fertility:		
Not at all	100	34
A little	60	20
Somewhat	43	14
Very	86	29
Missing	8	3
Concerns about fertility affected treatment decisions:		
Not at all	172	58
A little	55	19
Somewhat	23	8
A lot	37	12
Missing	10	3
Fertility concerns led patient to choose not to receive chemotherapy	4	1
Fertility concerns led patient to choose one chemotherapy over another	3	1
Fertility concerns led patient to not receive endocrine therapy	4	1
Fertility concerns led patient to consider receiving endocrine therapy for < 5 years	35	12
Took special steps to lessen chance of infertility (some patients indicated >1 answer)	79	27
Embryo cryopreservation	4	1
Oocyte cryopreservation	18	6
Tissue cryopreservation	6	2
GnRH agonist	72	24
Discussed fertility issues with physician before starting therapy	198	67

[a] Denominators for (%) are 136 and 161 from item above.

Gallen International Breast Cancer Conference 2017 (BCC 2017) showed 46% of the respondents were not aware of current guidelines on pregnancy in BC survivors, suggesting insufficient patient-doctor information and discussions [20]. The majority of women in HOHO Europe expressed fertility concerns at decision-making and over a third of them reported this influenced their treatment decisions; while very few decided not to take chemotherapy or ET, 12% opted to take ET for fewer than 5 years. Non-adherence to adjuvant endocrine therapy is frequent among young women [21] and associated with reduced overall survival [22].

Unfortunately, despite several safe techniques are currently available to preserve fertility in women undergoing chemotherapy [23], only a small fraction of reproductive-aged cancer patients are evaluated for fertility preservation or undergo fertility-preserving procedures in many countries, as confirmed by our data [13,24]. No specific data on factors influencing the use of fertility preservation measures in Europe are available, but the low proportion of patients taking fertility measures in our study, compared with the significant number discussing fertility issues before starting treatment, could be related to reimbursement issues/access or time constraints as in case of neo-adjuvant chemotherapy [25]. The use of GnRHa administration during chemotherapy to prevent chemotherapy-induced amenorrhea was the most common procedure in our setting, more common in Europe as compared with the US counterpart [14].

Having children was the only variable significantly associated with fertility concern in multivariable analysis; in parous women fertility concern was 25% lower compared with nulliparous women. As delayed childbearing is increasing worldwide [5], health professionals should provide women with timely information on fertility preservation techniques and future pregnancies. This is particularly relevant in women who are prescribed extended ET. The lack of prospective research so far allows physicians not to address or even discourage pregnancy after BC. Several registries and prospective studies are currently evaluating fertility and pregnancy issues in young patients with BC and will finally provide definitive data to address their still unmet needs. Among those, the POSITIVE study (IBCSG 48–14/BIG 8–13, NCT02308085) aims to elucidate safety and feasibility, both for the mother and the offspring, of a temporary interruption of ET to allow conception in women who, despite being diagnosed at a younger age (<40 years), are at risk of definitive infertility after lengthy anticancer treatments.

As reported by Howard-Anderson and colleagues in their systematic literature review [10], our study confirms chemotherapy significantly affects personal lives, in particular influencing work and family commitments and deteriorating sexual interactions. This can translate into significant financial pressures and difficulties, as shown in a recent analysis of the financial hardships experienced by cancer survivors [26]. Young women may not have accumulated asset, they may be just starting to build their financial foundation. Return to work may be challenging and younger women with children may need to pay for additional childcare during treatment.

Despite addressing the most relevant needs and concerns of young BC patients, the questionnaire did not cover other relevant aspects, e.g. decision-making processes and psycho-social dynamics of sexual minorities and of carriers of cancer predisposition gene mutations.

Although this study identified problems of young European

Table 3
Results from log binomial regression analysis evaluating association between patient/disease characteristics and fertility concerns (dichotomized as “very or somewhat concerned”, n = 129, versus “a little or not at all concerned”, n = 160).

Variable	Univariable models					Multivariable model		
	n/N[a]	(%)	Relative risk	95% CI	P	Relative risk	95% CI	P
Country								
Switzerland	40/88	(45)	1.00					
Italy	89/201	(44)	0.97	0.74 to 1.28	*0.853*			
Age								
≥35 years	77/198	(39)	1.00			1.00		
<35 years	52/91	(57)	1.47	1.15 to 1.89	*0.002*	1.01	0.87 to 1.17	*0.944*
College educated								
No	33/94	(35)	1.00			1.00		
Yes	96/195	(49)	1.40	1.03 to 1.91	*0.032*	1.09	0.95 to 1.27	*0.225*
Married or in a significant relationship								
No	67/101	(66)	1.00			1.00		
Yes	62/188	(33)	0.50	0.39 to 0.64	*<.001*	0.93	0.78 to 1.11	*0.442*
Employed full time								
No	37/115	(32)	1.00			1.00		
Yes	92/174	(53)	1.64	1.22 to 2.22	*0.001*	1.05	0.92 to 1.20	*0.47*
Financially comfortable								
No	71/167	(43)	1.00					
Yes	58/122	(48)	1.12	0.87 to 1.45	*0.393*			
First-degree relative with breast or ovarian cancer								
No	70/164	(43)	1.00					
Yes	59/125	(47)	1.11	0.86 to 1.43	*0.442*			
With comorbidities								
No	118/266	(44)	1.00					
Yes	11/23	(48)	1.08	0.69 to 1.69	*0.742*			
Received/receiving chemotherapy								
No	52/119	(44)	1.00					
Yes	77/170	(45)	1.04	0.80 to 1.35	*0.789*			
Already receiving endocrine therapy								
No	51/143	(36)	1.00			1.00		
Yes	78/146	(53)	1.50	1.15 to 1.96	*0.003*	1.09	0.95 to 1.26	*0.20*
Underwent mastectomy								
No	81/176	(46)	1.00					
Yes	48/113	(42)	0.92	0.71 to 1.21	*0.557*			
Had children before cancer diagnosis								
No	93/133	(70)	1.00			1.00		
Yes	36/156	(23)	0.33	0.24 to 0.45	*<.001*	0.75	0.64 to 0.89	*0.001*
History of therapeutic abortions								
No	113/256	(44)	1.00					
Yes	16/33	(49)	1.10	0.75 to 1.60	*0.626*			
History of infertility treatments before diagnosis								
No	120/277	(43)	1.00			1.00		
Yes	9/12	(75)	1.73	1.22 to 2.46	*0.002*	1.14	0.81 to 1.61	*0.445*
History of difficulty becoming pregnant								
No	121/272	(44)	1.00					
Yes	8/17	(47)	1.06	0.63 to 1.78	*0.833*			
No longer menstruating at time of survey								
No	67/172	(39)	1.00			1.00		
Yes	62/117	(53)	1.36	1.06 to 1.75	*0.017*	1.02	0.89 to 1.18	*0.752*
Sexually active since cancer diagnosis[b]								
No	36/84	(43)	1.00					
Yes	81/182	(45)	1.04	0.77 to 1.40	*0.802*			
pT								
1	65/146	(44)	1.00					
2/3/4/X	64/143	(45)	1.01	0.78 to 1.30	*0.968*			
pN								
0	64/136	(47)	1.00					
1/2/3/X	65/153	(42)	0.90	0.70 to 1.17	*0.434*			
pM								
0	127/280	(45)	1.00					
1	2/9	(22)	0.49	0.14 to 1.67	*0.255*			
Grade [c]								
1 or 2	50/114	(44)	1.00					
3	73/162	(45)	1.03	0.79 to 1.34	*0.843*			
ER								
Negative	33/73	(45)	1.00					
Positive	96/216	(44)	0.98	0.73 to 1.32	*0.910*			
PR								
Negative	34/84	(40)	1.00					
Positive	95/205	(46)	1.14	0.85 to 1.54	*0.374*			
HER2								
Negative	100/219	(46)	1.00					
Positive	29/70	(41)	0.91	0.66 to 1.24	*0.543*			

[a] 8 missing information.
[b] 23 missing information.
[c] 13 missing information.

Table 4
Descriptive comparison between European and US participants.

	US No. (%)	EU No. (%)
	620 (100)	297 (100)
Age <35 years	229 (37)	95 (32)
Married or in a significant relationship	474 (76)	192 (65)
Had children before BC diagnosis	409 (66)	160 (54)
Never pregnant	158 (25)	119 (40)
Before BC wished to have future children	230 (37)	161 (54)
At time of survey wished to have future children	160 (26)	120 (40)
If wanted more children, concerned about: (some women indicated more than one)	*n = 160*	*n = 120*
Caring for them if cancer recurred	27 (17)	45 (38)
Children having increased risk of developing cancer	70 (44)	38 (32)
Pregnancy would increase risk of recurrence	–	56 (47)
Concern not to want more children: (some women indicated more than one)	*n = 460*	*n = 177*
Caring for them if cancer recurred	18 (4)	28 (16)
Children having increased risk of developing cancer	33 (7)	22 (12)
Pregnancy would increase risk of recurrence	59 (13)	16 (9)
Concerned about fertility at time of treatment decision-making (a little, somewhat or a lot)	319 (51)	189 (64)
Concern about fertility affected treatment decision (a little, somewhat or a lot)	160 (26)	115 (39)
Took special steps to decrease infertility	65 (10)	79 (27)
Discussed fertility issues with physician before starting therapy	424 (68)	198 (67)

Table 5
Differences in the distribution of CARES-SF domain scores according to women's demographic and clinical characteristics.

Characteristic	Physical (N = 292)				Medical (N = 291)				Psychosocial (N = 293)				Sexual (N = 288)				Marital (N = 238)			
	N	Mean	SD	P	N	Mean	SD	P	N	Mean	SD	P	N	Mean	SD	P	N	Mean	SD	P
Age																				
≥35 years	199	0.86	0.63	*0.954*	198	0.29	0.44	*0.397*	200	0.85	0.60	*0.267*	197	1.28	1.05	*0.367*	168	0.50	0.54	*0.598*
<35 years	93	0.87	0.60		93	0.24	0.47		93	0.77	0.55		91	1.40	1.13		70	0.54	0.62	
College educated																				
No	96	0.97	0.64	*0.052*	96	0.26	0.40	*0.671*	96	0.77	0.54	*0.322*	94	1.33	1.12	*0.938*	76	0.58	0.61	*0.219*
Yes	196	0.82	0.61		195	0.28	0.47		197	0.85	0.60		194	1.32	1.06		162	0.48	0.54	
Married or in a significant relationship																				
No	101	0.95	0.64	*0.076*	101	0.31	0.51	*0.415*	102	0.92	0.61	***0.039***	100	1.44	1.14	*0.164*	56	0.64	0.63	*0.057*
Yes	191	0.82	0.61		190	0.26	0.41		191	0.77	0.56		188	1.26	1.04		182	0.47	0.54	
Employed full time																				
No	118	0.87	0.63	*0.856*	118	0.31	0.46	*0.261*	118	0.82	0.54	*0.993*	114	1.23	1.01	*0.246*	99	0.56	0.68	*0.267*
Yes	174	0.86	0.61		173	0.25	0.44		175	0.82	0.61		174	1.38	1.12		139	0.48	0.46	
Had children before cancer diagnosis																				
No	133	0.88	0.59	*0.643*	133	0.27	0.48	*0.827*	134	0.84	0.58	*0.616*	134	1.33	1.10	*0.895*	95	0.51	0.60	*0.981*
Yes	159	0.85	0.64		158	0.28	0.42		159	0.81	0.58		154	1.31	1.06		143	0.51	0.54	
Received/receiving chemotherapy																				
No	119	0.77	0.61	***0.021***	118	0.28	0.41	*0.918*	120	0.78	0.57	*0.291*	118	1.16	1.03	***0.039***	102	0.50	0.60	*0.705*
Yes	173	0.94	0.62		173	0.27	0.48		173	0.85	0.59		170	1.43	1.09		136	0.53	0.54	
Already receiving endocrine therapy																				
No	145	0.93	0.65	*0.095*	145	0.27	0.38	*0.900*	145	0.84	0.57	*0.663*	141	1.35	1.11	*0.676*	123	0.56	0.66	*0.203*
Yes	147	0.81	0.58		146	0.28	0.51		148	0.81	0.59		147	1.29	1.05		115	0.47	0.44	
Underwent mastectomy																				
No	177	0.85	0.61	*0.505*	177	0.30	0.46	*0.349*	178	0.83	0.58	*0.875*	173	1.26	1.08	*0.282*	146	0.55	0.63	*0.130*
Yes	115	0.90	0.63		114	0.25	0.43		115	0.81	0.59		115	1.40	1.07		92	0.45	0.44	
Sexually active since cancer diagnosis[a]																				
No	85	0.90	0.65	*0.310*	85	0.26	0.46	*0.795*	85	0.83	0.52	*0.760*	84	1.35	1.15	*0.807*	53	0.61	0.74	*0.241*
Yes	184	0.82	0.56		184	0.28	0.45		185	0.81	0.59		184	1.32	1.03		171	0.49	0.51	

Abbreviations: SD, standard deviation.
Possible range of scores is 0–4 (lower scores, better QoL).
[a] 23 missing information on physical domain score, 22 missing information on medical domain score, 23 missing information on psychosocial domain score, 20 missing information on sexual domain score, 14 missing information on marital domain score.

women when diagnosed with BC, our findings should be interpreted in the context of the study limitations, the most relevant being sample composition. Attitudes and concerns in women from other cultural and healthcare systems could differ substantially. A preliminary comparison between the US and European cohort shows several differences between the two cohorts. The present data summarize the baseline findings: continued data collection will provide deeper insights on young BC patients concerns, inform whether these differences persist over time, further highlight cultural/social specificities and potentially improve their multidisciplinary care.

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Compliance with ethical standards

Conflict of interest

The authors have declared no conflicts of interest.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent

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

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.breast.2019.07.001.

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