The Oncologist®

Global Health and Cancer

Long-Term Gynecological Cancer Survivors in Côte d'Or: Health-Related Quality of Life and Living Conditions

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Disclosures of potential conflicts of interest may be found at the end of this article.

Key Words. Health-related quality of life • Cervical cancer • Ovarian cancer • Endometrial cancer

Abstract

Background. The likelihood that health-related quality of life (HRQoL) could depend on factors other than clinical data increases with the duration of follow-up since diagnosis. The aim of this study was to identify determinants of long-term HRQoL in women with cervical, endometrial, and ovarian cancer. Secondary objectives were to describe their living conditions (sexual function, psychological distress, social and professional reinsertion).

Materials and Methods. In a cross-sectional survey, women diagnosed with cervical, endometrial, and ovarian cancers from 2006 to 2013 were selected through the French gynecological cancers registry of Côte d'Or. Validated questionnaires exploring HRQoL (short-form health survey; SF-12), anxiety and depression (Hospital Anxiety and Depression Scale), social support (Sarason's Social Support Questionnaire), sexual function (Female Sexual Function Index), and living conditions (EPICES questionnaire) were used to assess HRQoL and its determinants. Social and professional reinsertion were also investigated using study-specific questionnaires. Determinants of HRQoL were identified using a multivariable mixed-regression model for each composite score of the SF-12.

Results. In total, 195 gynecological cancer survivors participated in the survey. HRQoL was deteriorated for almost all the SF-12 dimensions. The main determinants of poor HRQoL were comorbidities, deprivation, lack of availability and satisfaction with social support, and psychological outcomes. Thirty-four percent of survivors of gynecological cancer reported a negative impact of cancer on their work, and 73% reported an impaired ability to work after treatment.

Conclusions. Long-term HRQoL of survivors of gynecological cancer is not impacted by stage of disease. Specific interventions should focus on issues that promote social and professional reintegration and improve HRQoL. ***The Oncologist*** 2019;24:e490–e500

Implications for Practice: This study shows that women with gynecological cancer have problems related to work and sexual dysfunction, even 5 years after diagnosis. The results of this study will help improve clinicians' awareness of the factors affecting the lives of gynecological cancer survivors, even long after diagnosis and treatment. They will also highlight for clinicians the areas that are of importance to gynecological cancer survivors, making it possible to guide management of these patients with a view to preventing deteriorated health-related quality of life after treatment. For the health authorities, the results of this study underline that more than 5 years after gynecological cancer, the initial stage of disease no longer affects quality of life, but there is a clear need for actions targeting socio-professional reintegration of survivors.

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Introduction

In France, gynecological cancers (GC) represent 10% of new cancer cases among women [1]. The main types are cervical, endometrial, and ovarian cancers. Each of these is unique in terms of prognosis, treatment, and age at onset. Early detection and improvement in treatment of these cancers has led to improvements in survival and, consequently, an increase in the number of survivors [2]. However, survival is accompanied by several negative aspects, such as fatigue, physical changes, sexual dysfunction, anxiety, and/or depression [3, 4]. In addition to the physical and psychological disorders, survivors of gynecological cancer can experience economic problems related to work, or access to loans and insurance [5]. Although cancer occurs mainly in older adults, some people, particularly survivors of cervical and ovarian cancer, may experience cancer at an age where work is still of major importance [6]. For these women, a return to work represents a return to a normal social life and helps them to regain their self-esteem. Furthermore, work is a source of emotional and financial support and has been shown to enhance health-related quality of life (HRQoL) by its positive effect on self-esteem [7]. Therefore, special attention must be paid to the well-being of survivors of gynecological cancer, as well as to their social and professional reintegration.

HRQoL is a multidimensional concept which encompasses physical and mental health as well as social well-being. Although in recent decades, several studies [8–10] have focused on HRQoL and its determinants in survivors of gynecological cancer, HRQoL has mainly been studied as it pertains to clinical data or with short follow-up durations. Our previous studies in long-term survivors of breast cancer [11, 12] have shown that the likelihood that HRQoL will depend on other factors increases in line with the length of follow-up since diagnosis. On this basis, using data from the specialized Côte d'Or GC registry, we performed this study in conjunction with HRQoL specialists and sociologists to investigate the clinical and socio-economic determinants of long-term HRQoL among survivors of cervical, endometrial, and ovarian cancer. Secondary objectives were to describe their living conditions (namely, in terms of sexual function, psychological distress, and social and professional reinsertion).

Materials and Methods

Patients

A cross-sectional study was carried out in survivors of gynecological cancer using data from the Côte d'Or (France) specialized registry. This is the only registry in France to focus on breast cancer and GC and has been collecting data on all cases of breast cancer and GC occurring in residents of Côte d'Or since 1982. The registry catchment area has approximately 500,000 inhabitants, including 270,000 women. This population is predominantly rural with low migration. Information about clinical characteristics, tumors, treatments, and vital status for patients recorded in the registry was obtained from various sources (medical records, letters to general practitioners, data of the National Institute of Statistics and Economic Studies). All women living in Côte d'Or and newly diagnosed with primary invasive nonmetastatic cervical, endometrial, or ovarian cancer from 1 January, 2006, to 31 December, 2013, were identified through the Côte d'Or registry. Women who died before January 2017 were excluded.

In January 2017, participants were mailed a study information pack that included the study questionnaires and an information letter. The letter presented the aims of the study and the legal information and invited them to participate in the study. In the absence of any response from patients within 1 month, a reminder was sent. The study was approved by the French national data protection authority (Commission nationale de l'informatique et des libertés MR003 N°1989764 v. 0).

Study Variables and Endpoints

HRQoL, sexual function, social support, socio-economic status, anxiety, and depression were assessed using validated self-administered questionnaires.

The Medical Outcomes Study 12-item Short Form health survey (SF-12) is a validated tool used to assess general HRQoL [13]. It comprises eight scales, namely physical functioning, role physical, bodily pain, role emotional, vitality, social functioning, mental health, and general health. All scales were scored according to the standard scoring method described in the SF-12 scoring manual [14]. Each score ranges from 0 to 100 with higher scores representing a better HRQoL. Two summary scales, namely the Physical Component Summary (PCS) and the Mental Component Summary (MCS), were computed from the eight scales.

The Female Sexual Function Index (FSFI) is a self-reported measurement of sexual functioning developed by Rosen [15]. A French version has been validated [16]. This 19-item questionnaire explores the six scales of sexual function, namely: desire, arousal, lubrication, orgasm, sexual satisfaction, and pain of intercourse. The global score ranges from 2 to 36 with a score <26.5 corresponding to sexual dysfunction. For each scale, a score <3.9 is considered as an alteration on that scale.

Anxiety and depression were assessed with the Hospital Anxiety and Depression Scale [17], a 14-item questionnaire that explores both anxiety and depression. To obtain a score for each dimension, the scores of the items on each scale are summed. Both the anxiety and depression subscores range from 0 to 21, with a score of 11 or higher indicating the probable presence of the mood disorder.

Social support was assessed using the Sarason Social Questionnaire [18]. This six-item tool measures the availability of social support and the respondent's perceived satisfaction with that support. Each item presents a situation in which the patient may need social support; in the first part of the response, the patient is asked to list a number of persons who could provide support in that situation, and in the second part, to evaluate their satisfaction with the support provided. Satisfaction scores range from 6 to 36, and availability scores range from 0 to 54. A higher social support

score represents better social support. These scores were categorized into two classes according to the median.

Socio-economic deprivation was assessed with the French EPICES questionnaire [19]. This questionnaire, developed specifically for the French context, contains 11 items that take into account the overall living conditions. It explores deprivation and social health. Scores vary from 0 to 100 and enables classification of patients as deprived or not (>30 and ≤30, respectively).

Social and occupational reintegration was assessed using a specific study questionnaire developed in conjunction with sociologists and psychologists. Data collected were problems relating to loans, income since diagnosis, ability to work (after treatment and at the time of assessment), impact of cancer, and perceived discrimination in their professional life.

Additional information, such as disease recurrence and patient's weight and height, was collected through a complementary questionnaire. Patient and tumor characteristics, including age at diagnosis, Charlson's comorbidity score, tumor stage, hormonal status, and treatments, were extracted from the Côte d'Or GC registry database. Age at diagnosis was classed as <70 and ≥70 years. Time since diagnosis was categorized as <5 and ≥5 years. Body mass index (BMI) was classified as underweight and normal weight (BMI ≤25 kg/m^2) and overweight (BMI > 25 kg/m^2). Tumor stage was categorized according to the International Federation of Gynecology and Obstetrics.

Statistical Analysis

We compared clinical characteristics and treatment between respondents and nonrespondents using the chi-square or Fisher's exact test for categorical variables and the Mann-Whitney test for continuous variables. For variables with more than two classes, we performed the Freeman-Halton or Kruskal-Wallis test depending on whether the variable was qualitative or continuous. A descriptive analysis of clinical and social characteristics and treatment was performed for each cancer type and for the whole population. Qualitative variables are presented as number and percentage, and quantitative variables are presented as mean ± SD or median and range as appropriate. The numbers of missing scores are also provided. HRQoL scores were described and compared across tumor sites. We assessed and described social and professional reinsertion in patients aged less than 60 years at the time of diagnosis. To identify the determinants of HRQoL, we performed a mixed regression model. Variables with a p value <.20 by univariate analysis were eligible for inclusion in the multivariate analysis. Analyses were adjusted for age at the time of the survey, tumor site, menopausal status, treatment by radiotherapy, and time since diagnosis to account for a response bias because respondents and nonrespondents differed on these factors. Significant determinants of HRQoL were determined with a backward stepwise selection procedure. The results are reported as multivariable analysis coefficients, SDs, and p values.

Two-sided tests were used when reporting the results. As SF-12 HRQoL scores cannot be considered independent of each other, Bonferroni's correction was used to adjust the α-risk in the two multivariable models. The significance limit was thus set at 0.025 for multivariable models.

Analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, NC).

Results

Four hundred and seventy-two patients with cervical, endometrial, and ovarian cancers were eligible for this study. Among these, 37 were lost to follow-up because of an invalid address and the questionnaire was mailed to 435 participants. Among these, 195 completed the questionnaire (Fig. 1).

Respondents and nonrespondents differed in terms of age at diagnosis, age at the time of the survey, tumor site, hormonal status, radiotherapy treatment, and time since diagnosis (Table 1).

Description of Clinical and Pathological Features of Participants

The clinical, socio-demographic, and pathological characteristics of the participants by cancer type are shown in Table 2. Among participants, 103 (53%), 50 (26%), and 42 (22%) had endometrial, cervical, and ovarian cancer, respectively (Fig. 1). The median time since diagnosis was 74 months (range, 36–131) for the whole population. The mains characteristics of the population were a time since diagnosis ≥5 years in 65%, BMI >25 in 55%, no comorbidities in 75%, no relapse in 74%, and presence of deprivation in lower 69%. More than 95% of patients underwent surgery and more than half were treated with a combination of therapies.

Survivors of endometrial cancer were older (65.13 ± 9.45), had a higher BMI, and had comorbidities more often than patients with other gynecological cancers. Survivors of cervical cancer were younger (47.34 ± 12.93) and more often premenopausal (66%). Survivors of ovarian cancer were mostly initially diagnosed at stage III (46%) and had not undergone radiotherapy (Table 2). Deprivation was present in respectively 44%, 27%, and 24% of women with cervical, endometrial, and ovarian cancer.

HRQoL, Sexual Function, Social Support, Anxiety, and Depression

The scores of HRQoL, anxiety, depression, sexual function, and social support assessments are presented in Tables 3 and 4.

HRQoL Scores

Means scores for the SF-12 dimensions were mainly under 60, except physical functioning, bodily pain, and social functioning. There were less than 10% of missing values in the summary scores of the SF-12. Mean SF-12 scores were not statistically different between CS, except for physical functioning, which was higher in cervical and ovarian CS than in endometrial CS (p = .004).

Sexual Function

The mean score of FSFI was 17 (SD ± 10.21) for all diagnoses. Eighty out of the 98 (82%) women for whom it was

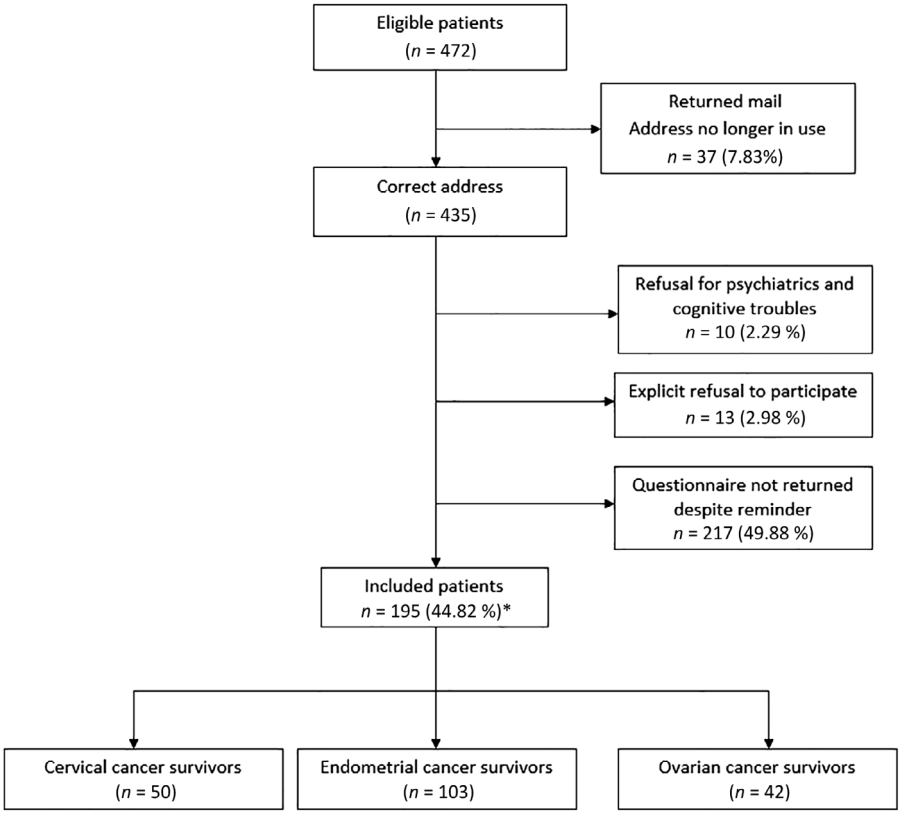

Figure 1. Flow chart of the study population. Number of women who responded to the questionnaires, number who did not respond, and number of women with cervical, endometrial, and ovarian cancers, respectively. *Participation rate was calculated using number of correct addresses as denominator.

possible to generate a global score reported a sexual dysfunction. Among the women who had global score, 69% of survivors of cervical cancer and 89% of survivors of both endometrial and ovarian cancer reported sexual dysfunction. Means scores for each subscale were < 3.9 regardless of location. Meanwhile, the scores were better in survivors of cervical cancer (Table 3).

Social Support, Anxiety, and Depression

The median social support availability score was 12 and the median social support satisfaction score was 30.

Using the threshold of 11 to define the presence of mood disorders, there were 66 cases (37%) of anxiety and 25 cases (14%) of depression in the whole population. According to tumor site, there were 20 (42%), 30 (32%), and 16 (39%) cases of anxiety in survivors of cervical, endometrial, and ovarian cancer, respectively. Survivors of cervical cancer were more depressed than survivors of other gynecological cancer (n = 13, 27%).

Determinants of HRQoL

Whole Population

Table 5 shows the significant determinants of HRQoL in the overall population and among survivors of cervical, ovarian, and endometrial cancer.

By multivariate analysis, significant determinants of physical component of HRQoL were BMI (p = .004), EPICES deprivation score (p = .005), Charlson's comorbidity score (p = .012), depression (p = .007), and hospitalization within the last 12 months (p = .003). Survivors of gynecological cancer who were overweight, had comorbidities, were deprived, or had been hospitalized within the last 12 months had worse HRQoL. Anxiety (p < .001), depression (p = .004), and EPICES deprivation score (p = .001) were significantly associated with MCS.

By Tumor Site

In survivors of cervical cancer, depression (p < .001) and social support availability (p = .012) were linked to PCS, whereas women who were satisfied with their social support, were not deprived, and were not hospitalized within the last 12 months were more likely to have good mental HRQoL. EPICES deprivation score (p = .001) and Charlson's comorbidity score (p = .005) were determinants of worse physical HRQoL in survivors of endometrial cancer. Patients with anxiety (p = .001) and deprivation (p = .001) were more likely to have worse mental HRQoL. Social support was a determinant of physical and mental HRQoL among survivors of ovarian cancer.

Social and Occupational Reinsertion

Ninety-two patients (47%) were aged <60 years at diagnosis. Among these, 35 (39%) specified that their income had decreased since diagnosis. Twenty-five (30%) women had sought a bank loan since diagnosis, and eight (32%)

Table 1. Comparison of clinical and pathological characteristics between respondents and nonrespondents

Characteristics	Respondents (*n* = 195), *n* (%)	Nonrespondents (*n* = 217), *n* (%)	*p* value
Age at diagnosis			.015[a,b]
Mean (SD)	59.26 (13.24)	62.75 (11.19)	
Median (min–max)	60 (20–86)	62 (30–88)	
Age at time of survey			.003[a,b]
Mean (SD)	65.78 (13.37)	69.83 (11.31)	
Median (min–max)	66 (26–93)	70 (34–94)	
Time since diagnosis (months)			.008[a,b]
Means (SD)	78.18 (28.32)	85.16 (26.30)	
Median (min–max)	74 (36–131)	87 (36–130)	
Time since diagnosis			.001[b]
<5 years	68 (34.87)	45 (20.74)	
≥5 years	127 (65.13)	172 (79.26)	
Cancer type			.015[b]
Cervical cancer	50 (25.64)	48 (22.12)	
Endometrial cancer	103 (52.82)	142 (65.44)	
Ovarian cancer	42 (21.54)	27 (12.44)	
Tumor stage[c]			.622
I	145 (75.13)	162 (74.65)	
II	19 (9.84)	27 (12.44)	
III	29 (15.03)	28 (12.90)	
Unknown	2	0	
Menopausal status			.002[b]
Menopausal	151 (77.44)	193 (88.94)	
Nonmenopausal	44 (22.56)	24 (11.06)	
Charlson score			.375
0	118 (75.16)	134 (70.90)	
≥1	39 (24.84)	55 (29.10)	
Missing	38	28	
Surgery			.165
Yes	184 (95.83)	213 (98.16)	
No	8 (4.17)	4 (1.84)	
Unknown	3	0	
Chemotherapy			.461
Yes	53 (27.75)	53 (24.54)	
No	138 (72.25)	163 (75.46)	
Unknown	4	1	
Radiotherapy			.001[b]
Yes	98 (51.04)	145 (67.44)	
No	94 (48.96)	70 (32.56)	
Unknown	3	2	
Treatments			.056
Surgery only	59 (32.07)	50 (23.47)	
Surgery ± Radiotherapy ± Chemotherapy	125 (67.93)	163 (76.53)	
Unknown	11	4	

[a]Mann-Whitney test.
[b]Significant at $p < .05$.
[c]Tumor stage according to International Federation of Gynecology and Obstetrics.

reported problems obtaining it (refusal, higher premiums, or exclusions in the contract). Thirty-five percent of women reported that cancer had a negative impact on their professional life, with half of these survivors of ovarian cancer. Survivors of gynecological cancer also reported a decrease in their ability to work after treatment (73%) and at the time of assessment (49%). The full details of the social and occupational reintegration are given in Table 6.

Discussion

This study analyzed the medical and socioeconomic determinants of HRQoL among women identified through the French regional registry of GC of Côte d'Or and treated for the three main GC subtypes.

One hundred and ninety-five women (44.82%) participated in this study. Although the participation rate was low, it is similar to expected rates in a population-based study. Our response rate was similar to that reported by Le Borgne et al. [20]. This may be because of the length of the questionnaires and the age of patients. Indeed, nonrespondents were older than respondents. In addition, some patients declared that they did not feel concerned by this study because they felt cured.

A surprising finding was that nearly half the women with ovarian cancer had stage III disease at the time of diagnosis, and nearly 65% had a time since diagnosis ≥5 years, in line with a previous report by Cress et al. [21]. One possible explanation for this is the improvement in surgical techniques, which have largely contributed to minimizing residual disease [22], as well as the emergence of new targeted treatments, for example PARP inhibitors, and the fact that these patients can be considered as "cured" [10].

These results may be useful for clinical practice in terms of counseling about the prognosis of this type of cancer. Our study showed that unlike survivors of breast cancer, women with GC had a deteriorated HRQoL about 5 years after diagnosis. Korfage et al. [8] and Le Borgne et al. [20] have also shown an impairment of HRQoL in survivors of gynecological cancer, although their population consisted of survivors of cervical cancer only. Physical functioning was the only subscale of the SF-12 that differed

Table 2. Clinical, socio-demographic, and pathological characteristics of the participants by tumor site

Variables	Cervical cancer (*n* = 50), *n* (%)	Endometrial cancer (*n* = 103), *n* (%)	Ovarian cancer (*n* = 42), *n* (%)	*p* value	Whole population (*n* = 195), *n* (%)
Age at diagnosis				<.001[a,b]	
Mean (SD)	47.34 (12.93)	65.13 (9.45)	59.07 (12.52)		59.26 (13.24)
Median (min–max)	45 (26–81)	65 (42–86)	59.50 (20–82)		60 (20–86)
Age at time of survey				<.001[a,b]	
Mean (SD)	53.72 (13.21)	71.77 (9.08)	65.45 (12.93)		65.78 (13.37)
Median (min–max)	53.50 (33–88)	71 (52–93)	66.00 (26–87)		66 (26–93)
Time since diagnosis (months)				.603[a]	
Mean (SD)	75.26 (27.60)	80.20 (29.27)	76.71 (27.06)		78.18 (28.32)
Median (min–max)	69 (39–129)	76 (36–131)	71 (39–127)		74 (36–131)
Age at diagnosis					
<70 years	47 (94.00)	70 (67.96)	33 (78.57)	.002[b]	150 (76.92)
≥70 years	3 (6.00)	33 (32.04)	9 (21.43)		45 (23.08)
Time since diagnosis				.825	
<5 years	19 (38.00)	34 (33.01)	15 (35.71)		68 (34.87)
≥5 years	31 (62.00)	69 (66.99)	27 (64.29)		127 (65.13)
Tumor Stage[c]				<.001[b,d]	
I	34 (68.00)	94 (92.16)	17 (41.46)		145 (75.13)
II	11 (22.00)	3 (2.94)	5 (12.20)		19 (9.84)
III	5 (10.00)	5 (4.90)	19 (46.34)		29 (15.03)
Unknown	0	1	1		2
Menopausal status				<.001[b]	
Menopausal	17 (34.00)	99 (96.12)	35 (83.33)		151 (77.44)
Nonmenopausal	33 (66.00)	4 (3.88)	7 (16.67)		44 (22.56)
Charlson score				.016[b]	
0	35 (85.37)	60 (66.67)	23 (88.46)		118 (75.16)
≥1	6 (14.63)	30 (33.33)	3 (11.54)		39 (24.84)
Missing	9	13	16		38
Surgery				.001[b,d]	
Yes	42 (85.71)	100 (99.01)	42(100)		184 (95.83)
No	7 (14.29)	1 (0.99)	0 (0)		8 (4.17)
Unknown	1	2	0		3
Chemotherapy				<.001[b]	
Yes	17 (35.42)	5 (4.95)	31 (73.81)		53 (27.75)
No	31 (64.48)	96 (95.05)	11 (26.19)		138 (72.25)
Unknown	2	2	0		4
Radiotherapy				<.001[b]	
Yes	31 (63.27)	67 (66.34)	0 (0)		98 (48.96)
No	18 (36.73)	34 (33.66)	42 (100)		94 (51.04)
Unknown	1	2	0		3
Treatments				.353	
Surgery only	17 (40.48)	31 (31.00)	11 (26.19)		59 (32.07)
Surgery ± Radiotherapy ± Chemotherapy	25 (59.52)	69 (69.00)	31 (73.81)		125 (67.93)
Unknown	8	3	0		11
EPICES deprivation score				.072	
EPICES ≤30	27 (56.25)	60 (73.17)	29 (76.32)		116 (69.05)
EPICES >30	21 (43.75)	22 (26.83)	9 (23.68)		52 (30.95)
Missing	2	21	4		27

(continued)

Table 2. (continued)

Variables	Cervical cancer (*n* = 50), *n* (%)	Endometrial cancer (*n* = 103), *n* (%)	Ovarian cancer (*n* = 42), *n* (%)	*p* value	Whole population (*n* = 195), *n* (%)
BMI at time of survey				.039[b]	
BMI ≤25	28 (57.14)	37 (36.27)	21 (50.00)		86 (44.56)
BMI >25	21 (42.86)	65 (63.73)	21 (50.00)		107 (55.44)
Missing	1	1	0		2
Hospitalization in the last 12 months				1.000[d]	
No	48 (96.00)	98 (96.08)	40 (95.24)		186 (95.88)
Yes	2 (4.00)	4 (3.92)	2 (4.76)		8 (4.12)
Missing	0 (0)	1	0		1
Relapse				.034[b]	
No	36 (72.00)	82 (80.39)	25 (59.52)		143 (73.71)
Yes	14 (28.00)	20 (19.61)	17 (40.48)		51 (26.29)
Missing	0	1	0		1

[a]Kruskal-Wallis test.
[b]Significant at $p < .05$.
[c]Tumor stage according to International Federation of Gynecology and Obstetrics.
[d]Fisher exact or Freeman Halton test.
Abbreviation: BMI, body mass index.

Table 3. Sexual function and HRQoL scores of the studied population by tumor site

	Cervical cancer			Endometrial cancer			Ovarian cancer				Total		
Variables	*n* = 50	Mean (SD)	Median (min–max)	*n* = 103	Mean (SD)	Median (min–max)	*n* = 42	Mean (SD)	Median (mi–max)	*p* value	*n* = 195	Mean (SD)	Median (min–max)
Quality of life													
General health	48	57.81 (24.82)	60 (0–100)	101	57.82 (22.85)	60 (0–100)	42	54.76 (20.39)	60 (25–100)	.609	191	57.15 (22.77)	60 (0–100)
Physical functioning	49	75 (31.87)	100 (0–100)	99	56.82 (38.27)	50 (0–100)	41	74.39 (32.83)	100 (0–100)	.004[a]	189	65.34 (36.50)	75 (0–100)
Role physical	49	59.69 (32.70)	50 (0–100)	100	55.25 (30.93)	50 (0–100)	42	61.90 (25.29)	62.5 (0–100)	.384	191	57.85 (30.24)	50 (0–100)
Role emotional	50	58.75 (30.95)	50 (0–100)	98	58.29 (27.45)	50 (0–100)	42	59.23 (25.76)	50 (0–100)	.932	190	58.62 (27.91)	50 (0–100)
Bodily pain	50	67.5 (33.22)	75 (0–100)	98	63.26 (28.99)	75 (0–100)	42	64.88 (27.64)	62.5 (0–100)	.592	190	64.74 (29.77)	75 (0–100)
Mental health	50	55.75 (21.75)	50 (0–100)	100	58.12 (20.52)	50 (0–100)	42	61.01 (22.46)	62.5 (0–100)	.520	192	58.14 (21.24)	62.5 (0–100)
Vitality	49	42.86 (27.00)	50 (0–100)	97	44.84 (26.00)	50 (0–100)	41	49.39 (25.30)	50 (0–100)	.533	187	45.32 (26.08)	50 (0–100)
Social functioning	50	61.5 (29.11)	50 (0–100)	100	67.25 (25.55)	75 (0–100)	42	64.28 (26.56)	75 (0–100)	.547	192	65.10 (26.70)	75 (0–100)
Composites scores													
Physical Component Score	47	47.32 (11.05)	48.98 (18.61–67.76)	92	42.40 (11.44)	41.04 (16.67–61.53)	40	45.73 (9.59)	45.60 (17.48–66.25)	.021[a]	179	44.44 (11.11)	44.47 (16.67–67.76)
Mental Component Score	47	39.67 (11.29)	41.28 (15.1–60.59)	92	42.74 (9.92)	42.39 (16.86–62.39)	40	42.39 (10.19)	40.94 (17.51–66.03)	.390	179	41.86 (10.38)	41.52 (15.13–66.03)
Sexual function													
Desire	48	2.74 (1.34)	2.7 (1.2–6)	89	2.03 (1.09)	1.2 (1.2–6)	36	2.1 (1.24)	1.2 (1.2–5.4)	.004[a]	173	2.24 (1.23)	1.8 (1.2–6)
Arousal	45	2.66 (1.87)	3 (0–5.7)	85	1.57 (1.82)	0.6 (0–6)	38	1.67 (2.05)	0.6 (0–6)	.004[a]	168	1.89 (1.93)	1.2 (1.2–6)
Pain	44	2.42 (2.26)	2 (0–6)	82	1.27 (2.05)	0 (0–6)	32	1.52 (2.32)	0 (0–6)	.008[a]	158	1.64 (2.21)	0 (0–6)
Satisfaction	37	3.8 (1.82)	4.4 (0.8–6)	45	3.31 (1.74)	3.6 (0.8–6)	20	3.46 (1.97)	3.4 (0.8–6)	.335	102	3.52 (1.81)	4 (0.8–6)
Lubrication	45	2.51 (2.15)	2.1 (0–6)	84	1.38 (1.98)	0 (0–6)	36	1.27 (2.06)	0 (0–6)	.002[a]	165	1.66 (2.10)	0.3 (0–6)
Orgasm	45	2.58 (2.19)	2.8 (0–5.6)	87	1.39 (1.98)	0 (0–6)	37	1.36 (2.11)	0 (0–6)	.002[a]	169	1.70 (2.12)	0 (0–6)
Global Score	35	19.26 (9.76)	20.1 (2.6–31.9)	44	15.81 (9.90)	16.30 (2–36)	19	15.59 (11.52)	22.10 (2–35.4)	.210	98	17.00 (10.21)	18.10 (2–36)
Sexual dysfunction (%)													
Yes	24	68.57		39	88.64		17	89.47		.0450[a]	80	81.63	
No	11	31.43		5	11.36		2	10.53			18	18.37	
Missing	15			59			23				97		

[a]Significance level <.05.

across tumor sites. Indeed, survivors of endometrial cancer have impaired physical functioning compared to other types of GC. One potential explanation for this result is that endometrial cancer was treated by surgery in the majority, in association with radiotherapy, which is known to affect HRQoL even in the long term [23]. Meanwhile, we cannot exclude the fact that survivors of endometrial cancer were older than the other patient groups.

Table 4. Social support, anxiety, and depression scores by tumor site

	Cervical cancer			Endometrial cancer			Ovarian cancer				Total		
Variables	*n* = 50	Mean (SD)	Median (min–max)	*n* = 103	Mean (SD)	Median (min–max)	*n* = 42	Mean (SD)	Median (min–max)	*p* value	*n* = 195	Mean (SD)	Median (min–max)
Social support													
Social support availability	44	12.88 (7.89)	12.5 (0–32)	82	14.96 (9.20)	14 (0–42)	33	14.24 (8.01)	12 (0–36)	.753	159	14.24 (8.61)	12 (0–42)
Social support satisfaction	36	26.75 (8.70)	30 (6–36)	69	29.01 (5.84)	30 (6–36)	28	29.07 (6.22)	30 (6–36)	.787	133	28.41 (6.83)	30 (6–36)
Social support availability, (%)										.989			
<12	19	43.18		36	43.90		14	42.42			69	43.40	
≥12	25	56.82		46	56.10		19	57.58			90	56.60	
Missing	6			21			9	21.43			36		
Social support satisfaction, (%)										.832			
<30	14	38.89		29	42.03		13	46.43			56	42.11	
≥30	22	61.11		40	57.97		15	53.57			77	57.89	
Missing	14			34			14				62		
HADS													
Anxiety	48	10.27 (4.41)	10 (1–20)	92	8.85 (4.21)	9 (0–20)	41	8.61 (4.45)	9 (0–19)	.122	181	9.17 (4.35)	9 (0–20)
Depression	48	7.1 (5.39)	6 (0–21)	92	6.24 (4.09)	6 (0–20)	39	5.46 (3.14)	5 (0–11)	.494	179	6.30 (4.32)	6 (0–21)
Anxiety (%)										.530			
<11	28	58.33		62	67.39		25	60.98			115	63.54	
≥11	20	41.67		30	32.61		16	39.02			66	36.46	
Missing	2			11			1				14		
Depression (%)										.006[a]			
<11	35	72.92		82	89.13		37	94.87			154	86.03	
≥11	13	27.08		10	10.87		2	5.13			25	13.97	
Missing	2	4		11			3				16		

[a]Significance level <.05
[b]Abbreviations: HADS, Hospital Anxiety and Depression Scale; max, maximum; min, minimum; SD, standard deviation.

Overweight, comorbidities, deprivation, less social support, and psychological distress were independent predictors of worse HRQoL among survivors of gynecological cancer in this study. Indeed, a high BMI has been linked to morbid-mortality in cancer survivors, especially of endometrial [24] and ovarian cancer [25]. In our study, 55% of women were overweight, with the highest representation among survivors of endometrial (64%) and ovarian (50%) cancer. Anxiety and depression were also determinants of HRQoL in this study. Indeed, it is well known that they are associated with an increase in morbidity and mortality in women with gynecological cancer [26]. Fear of recurrence may be an explanation for this. Indeed, fear of recurrence persists over time in patients with gynecological cancer [26]. In our study, one third of survivors of gynecological cancer had a time since diagnosis <5 years. For these women, recurrence could still occur and might be a source of worry for them.

Concerning the determinants of HRQoL across tumor sites, we observed that depression and social support were predictors of HRQoL in survivors of cervical cancer. Indeed, survivors of cervical cancer had the highest depression scores in this study. Our results are similar to those reported by Osann et al. [27], who reported a high level of depression (26%) 9–30 months after diagnosis in women with cervical cancer. Two hypotheses can support this findings, namely the fear of recurrence and worry about reproductive ability. Indeed, most survivors of cervical cancer in this study were premenopausal, and thus, sexual function and childbirth may be of great importance to them. Women with cervical cancer also had less social support available. In fact, as with other survivors, their ability to share problems with others decreased with time, suggesting waning social support [28].

In this study, the only determinant of HRQoL in survivors of ovarian cancer was social support. Teng et al. [10] found similar results. This suggests that survivors of ovarian cancer must pay more attention to psychosocial factors than physical sequelae [25]. However, it should be noted that other disorders induced by chemotherapy, such as neurotoxic and digestive disorders that could also impact HRQoL in this population, were not evaluated in our study.

Sexual function is an important component of HRQoL among survivors of gynecological cancer. Indeed, sexual dysfunction is associated with negative psychological changes and has a major impact on HRQoL in survivors of gynecological cancer. Furthermore, because of the nature, localization, and treatments for gynecological cancers, they incur the greatest risk of sexual dysfunction [29]. In our study, sexual function was impaired, but it is important to consider that when women reported no sexual activity within the last 4 weeks, overall FSFI score was generated.

Table 5. Significant determinants of health-related quality of life

Composite scores of the SF-12 and variables	Estimate	Standard error	*p* value
All tumor sites[a]			
PCS			
BMI			.004
≤25	0		
>25	−4.8384	1.6689	
EPICES deprivation score			.003
≤30	0		
>30	−5.4822	1.8513	
Charlson score at diagnosis			.012
0	0		
≥1	−4.7611	1.8568	
Depression			.007
<11	0		
≥11	−7.0969	2.5654	
Hospitalization within the last 12 months			.003
No	0		
Yes	−13.1185	4.3221	
MCS			
Anxiety			<.001
<11	0		
≥11	−8.4951	1.4557	
EPICES deprivation score			.004
≤30	0		
>30	−4.5987	1.5924	
Depression			.001
<11	0		
≥11	−7.2825	2.2468	
Cervical cancer[b]			
PCS			
Depression			<.001
<11	0		
≥11	−14.5456	3.0385	
Social support availability			.012
<12	0		
≥12	6.9634	2.6236	
MCS			
Social support satisfaction			.006
<30	0		
≥30	9.6458	3.2624	
Hospitalization within the last 12 months			.002
No	0		
Yes	−22.0084	6.4232	
EPICES deprivation score			.020
≤30	0		
>30	−8.2461	3.3655	
Endometrial cancer[b]			
PCS			
EPICES deprivation score			.001
≤30	0		
>30	−9.7354	2.6008	
Charlson score			.005
0	0		
≥1	−6.6126	2.3040	
MCS			
Anxiety			.001
<11	0		
≥11	−8.2655	2.0382	
EPICES deprivation score			.001
≤30	0		
>30	−9.2682	2.3462	
Ovarian cancer[c]			
PCS			
Social support satisfaction			.006
<30	0		
≥30	9.3569	3.0694	
MCS			
Social support satisfaction			<.001
<30	0		
≥30	15.6646	2.4965	
Social support availability			.020
<12	0		
≥12	6.6675	2.5706	

Mixed regression models.
[a]Adjusted for tumor site, time since diagnosis, hormonal status, treatment by radiotherapy, age.
[b]Time since diagnosis, hormonal status, treatment by radiotherapy, age.
[c]Time since diagnosis, hormonal status, age.
Abbreviations: BMI, body mass index; MCS, Mental Component Summary; PCS, Physical Component Summary; SF-12, 12-item Short Form health survey.

Therefore, this may have led to some overestimation of sexual impairment in our population.

Women with GC reported a decrease in their ability to work after treatment and also difficulties in obtaining loans, with a greater impact observed in women with ovarian cancer. An explanation for this reduced ability to work in women with ovarian cancer might be the fact that 74% of these patients were treated with chemotherapy, which has previously been reported to negatively affect work ability [30].

The strengths of our study are the use of validated instruments to assess HRQoL features and psychological outcomes and the use of a specialized registry database, which had the twofold advantage of being representative of patients treated in the region and enabling us to assess long-term HRQoL.

Table 6. Social and professional outcomes in women aged <60 years at diagnosis

Variables	Cervical cancer survivors (*n* = 41), *n* (%)	Endometrial cancer survivors (*n* = 30), *n* (%)	Ovarian cancer survivors (*n* = 21), *n* (%)	Total (*n* = 92), *n* (%)
Income since cancer diagnosis				
Increased	8 (20.00)	2 (6.67)	1 (5.00)	11 (12.22)
Unchanged	15 (37.50)	19 (63.33)	10 (50.00)	44 (48.89)
Decreased	17 (42.50)	9 (30.00)	9 (45.00)	35 (38.89)
Missing	1	0	1	2
Asked for a loan since treatment of cancer				
No	27 (69.23)	16 (66.67)	15 (75.00)	58 (69.88)
Yes	12 (30.77)	8 (33.33)	5 (25.00)	25 (30.12)
Missing	2	6	1	9
Proposition of insurance for loan				
Agreement	6 (50.00)	6 (75.00)	1 (20.00)	13 (52.00)
Problems with loans	4 (33.33)	0 (0)	4 (80.00)	8 (32.00)
No necessary assurance	2 (16.67)	2 (25.00)	0 (0)	4 (16.00)
Employment				
Unemployed	12 (30.77)	21 (72.41)	12 (60.00)	45 (51.14)
Employed	27 (69.23)	8 (27.59)	8 (40.00)	43 (48.86)
Missing	2	1	1	4
Difficult working conditions				
No	13 (39.39)	14 (58.33)	4 (25.00)	31 (42.47)
Yes	20 (60.61)	10 (41.67)	12 (75.00)	42 (57.43)
Missing	8	6	5	19
Reduced ability to work since end of treatment				
No	6 (15.79)	5 (17.86)	1 (5.26)	12 (14.12)
Yes	29 (76.32)	18 (64.29)	15 (78.95)	62 (72.94)
Not applicable	3 (7.89)	5 (17.86)	3 (15.79)	11 (12.94)
Missing	3	2	2	7
Reduced ability to work at the time of survey				
No	13 (35.14)	9 (32.14)	5 (26.32)	27 (32.14)
Yes	22 (59.46)	10 (35.71)	9 (47.37)	41 (48.81)
Not applicable	2 (5.41)	9 (32.14)	5 (26.32)	16 (19.05)
Missing	4	2	2	8
Impact of cancer on work				
Positive	7 (21.21)	4 (16.00)	4 (22.22)	15 (19.74)
Negative	10 (30.30)	8 (32.00)	9 (50.00)	27 (35.53)
None	16 (48.48)	13 (52.00)	5 (27.78)	34 (44.74)
Missing	8	5	3	16
Perceived discrimination				
No	20 (55.56)	13 (46.43)	9 (47.37)	42 (50.60)
Yes	7 (19.44)	3 (10.71)	3 (15.79)	13 (15.66)
Not applicable	9 (25.00)	12 (42.86)	7 (36.84)	28 (33.73)
Missing	5	2	2	9

Conclusion

In conclusion, 6 years after diagnosis, clinical factors such as disease stage were not found to have an impact on HRQoL in survivors of gynecological cancer. The main determinants of HRQoL 6 years after diagnosis were overweight, comorbidities, deprivation, anxiety and depression, and less social support. Because these factors are also determinants of HRQoL in the general population, we can assume that 6 years after diagnosis, HRQoL of survivors of gynecological cancer is not impacted by the stage disease, and

specific interventions in these populations should focus on the promotion of social and professional reintegration and improvement of HRQoL.

Acknowledgements

We thank Ludovic Bouzigues for data collection and Laurence Collet for correcting the manuscript. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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Disclosures

The authors indicated no financial relationships.

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