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Quality of life of older gynecologic oncology patients at the initiation of chemotherapy

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Abstract

Aim: To evaluate older gynecologic oncology patients' quality of life (QOL) at the initiation of chemotherapy and compare their QOL scores with a female age-matched general population (GP) sample.

Design: Cross-sectional.

Methods: Older ($n=122$) gynecologic oncology patients completed the European Organization for the Research and Treatment of Cancer Quality of Life Questionnaire (QLQ-C30) that evaluates global health and five functional scales (range from 0 to 100). Differences in QOL scores between our sample and the GP were evaluated using one-sample t-tests and effect sizes were calculated using Cohen's d .

Results: Patients' mean age was 70.7 years (± 6.6). Mean scores for the function scales ranged from 58.5 (± 31.1) for role function to 86.1 (± 17.0) for cognitive function. Compared to the GP, our sample reported significantly lower scores for global health status, social, role and physical functioning, and a significantly higher score for cognitive functioning. No differences were found in emotional functioning scores.

Patient or Public Contribution: No patient or public contribution.

1 | INTRODUCTION

As a consequence of the anticipated demographic shift, the occurrence of cancer in older adults is expected to increase by 70% in 10 years (Bluethmann et al., 2016; Pilleron et al., 2019; Weir et al., 2015). A major cause of cancer morbidity and mortality in older women is cancers of the female genital organs (Quaglia et al., 2009), with >70% occurring in women over 60 years of age (Centers for Disease Control and Prevention, 2019). Given that the number of older women with gynecologic cancer will increase dramatically,

detailed information is needed on the impact of cancer and its treatment on these patients' quality of life (QOL).

2 | BACKGROUND

Quality of life (QOL) is defined by the European Organization for the Research and Treatment of Cancer as an individual's overall satisfaction with life and general sense of personal well-being (European Organization for Research and Treatment of Cancer, 2021). It is an

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extremely important patient-reported outcome for older adults (van Leeuwen et al., 2019) and international action plans on ageing endorse its importance (Malva & Bousquet, 2016; World Health Organization, 2015). For oncology patients, QOL is considered the overall appraisal of the effect of the disease and its treatment (Cheng et al., 2018). Of note, the maintenance of a good QOL and independence are highly prioritised outcomes among older oncology patients (Fried et al., 2002; Soto-Perez-De-Celis et al., 2018). Findings from previous studies suggest that older adults are less willing than younger patients to receive life-prolonging treatment at the expense of their QOL (Pinquart & Duberstein, 2004; Soto-Perez-De-Celis et al., 2018; Wedding et al., 2007). Several studies have found that the QOL of women with gynecologic cancer is impaired by the disease, as well as by the treatment (Bodurka-Bevers et al., 2000; Jones et al., 2006; Liavaag et al., 2007; Sekse et al., 2019; Stavrakas et al., 2012; van Walree et al., 2019). An evaluation of QOL is particularly important, because while responses to treatment are observed, they may occur at the expense of worsening a patient's QOL (Bottomley et al., 2019). This information is needed, particularly at the initiation of treatment, to guide patients and clinicians in shared decision-making processes (Quinten et al., 2015).

As noted in two reviews (Abbasi, 2019; Sanoff et al., 2007), studies of patient-reported outcomes, like QOL, are lacking for older gynecologic oncology patients. In the only systematic review on QOL in older women diagnosed with gynecologic cancer (Martin et al., 2020), the authors noted that despite the increasing incidence of gynecologic cancers with age, only two of the 15 studies evaluated QOL exclusively in older women with gynecologic cancer at the initiation of chemotherapy (Novackova et al., 2015; Stewart et al., 2009). However, one of these studies included only 32 women (Novackova et al., 2015) and the other evaluated only functional status and mobility (Stewart et al., 2009).

In this systematic review (Martin et al., 2020), five different QOL measures were identified. Of note, the European Organization for the Research and Treatment of Cancer Quality of Life Questionnaire (QLQ-C30) was used in eight of the 15 studies. The QLQ-C30 is one of the most widely used cancer-specific patient-reported outcome measures (Cheng et al., 2018; Jones et al., 2006; Nolte et al., 2019; Rombach et al., 2016). This measure evaluates global health; five functional scales (i.e. physical, role, cognitive, emotional and social functioning); eight common symptoms associated with cancer and its treatment (i.e. fatigue, pain, nausea and vomiting, dyspnoea, appetite loss, sleep disturbance, constipation, and diarrhoea); and perceived financial impact of the disease and treatment (Aaronson et al., 1993). In addition, normative data are available for different age groups in the general population (GP) across North America and several European countries (Fossa et al., 2007; Hjermstad et al., 1998b; Nolte et al., 2019). These data provide useful reference values for comparative purposes and for interpreting the QLQ-C30 scores of oncology patients (Nolte et al., 2019; Quinten et al., 2015).

Findings from several studies of the GP suggest that QOL decreases as women age (Fossa et al., 2007; Hjermstad et al., 1998a; Nolte et al., 2019). However, these age effects varied among the

various domains of QOL, as well as among different countries. For example, in a study of the GP in 13 European countries, Canada and the United States ($n=15,386$), while physical and role functioning decreased with increasing age, emotional, cognitive and social functioning appeared to increase as individuals aged (Nolte et al., 2019). In two studies of the Norwegian GP ($n=2497$ (Fossa et al., 2007) and $n=1887$ (Hjermstad et al., 1998a)), women reported lower cognitive, physical, role and social function scores and higher emotional function scores with increasing age. These inconsistencies may be related to differences in sampling procedures across various studies (Nolte et al., 2019).

Five studies were found that evaluated QOL using the QLQ-C30 in gynecologic cancer patients prior to chemotherapy with a mean age of ≥ 55 years (Bezjak et al., 2004; Brotto et al., 2016; de Boer et al., 2016; Greimel et al., 2013; Sorbe et al., 2012). Across these studies, the global health and function scale scores were highly variable. On a 0–100 scale, where higher scores indicate better function (Fayers et al., 2001), the scores for physical function varied from 67.9 (± 28.4) to 84.6; for role function from 44.0 (± 35) to 73.7; for cognitive function from 77.9 (± 26.7) to 88.0; for emotional function from 57.2 (± 3.1) to 77.6; for social function from 44.2 (± 34.4) to 80.4 and for global health from 43.7 (± 27.34) to 87.1 (Bezjak et al., 2004; Brotto et al., 2016; de Boer et al., 2016; Greimel et al., 2013). These inconsistent results may be related to relatively small sample sizes; differences in sample characteristics (e.g. age and specific type of gynecologic cancer), and/or actual age-related differences. None of the studies compared their findings with normative data from GP.

Given the importance of QOL in older oncology patients (Malva & Bousquet, 2016; van Leeuwen et al., 2019; World Health Organization, 2015); the limited number of studies on QOL in older gynecologic oncology patients at the initiation of chemotherapy; and the lack of an evaluation of the QOL of older gynecologic oncology patients compared to the GP, additional research is needed. Therefore, the purposes of this study, in a sample of older gynecologic oncology patients ($n=122$), were to evaluate their QOL at the initiation of chemotherapy and compare their QLQ-C30 scores with an age-matched sample without cancer drawn from the GP of Norway (Fossa et al., 2007). Based on previous QOL scores reported by gynecologic cancer patients prior to chemotherapy (Bezjak et al., 2004; Brotto et al., 2016; de Boer et al., 2016; Greimel et al., 2013; Sorbe et al., 2012), we hypothesised that the older gynecologic oncology patients would have lower QOL scores (i.e. global health, and physical, role, cognitive, emotional and social function scores) at the initiation of chemotherapy compared to the GP.

3 | METHODS

3.1 | Sample and settings

This analysis is part of a longitudinal study of changes in functional status and cognitive function in older oncology patients receiving chemotherapy. The study's methods are published in detail

elsewhere (Torstveit et al., 2021). In brief, patients were recruited from one community and two university hospitals in Norway. Eligible patients were ≥ 60 years of age; had a diagnosis of gynecologic or colorectal cancer; were scheduled to receive primary or adjuvant chemotherapy; had a Montreal Cognitive Assessment (MoCA) score of ≥ 23 (Nasreddine et al., 2005); and a Karnofsky Performance Status (KPS) score of ≥ 60 (Ando et al., 2001). A total of 208 patients were approached and 149 consented to participate (71.6% response rate). Of these 149 patients, one withdrew and nine were excluded because they had a low MoCA score (< 23). Of the final 139 patients, 122 had gynecologic cancer and are included in this analysis.

3.2 | Instruments

3.2.1 | Demographic and clinical characteristics

Patients completed a demographic questionnaire, the KPS scale that ranged from 40 (disabled, requires special care and assistance) to 100 (normal, no complaints and no evidence of disease; Ando et al., 2001; Schnadig et al., 2008), and the Self-Administered Comorbidity Questionnaire (KPS and SCQ-16) (Sangha et al., 2003). The SCQ-16 evaluates the occurrence of, treatments for, and functional impact of 16 common comorbid conditions. Total SCQ-16 scores range from 0 to 48.

3.2.2 | QOL measure

The QLQ-C30 consists of five function scales (i.e. physical, role, cognitive, emotional and social), seven symptom scales (i.e. fatigue, pain, nausea and vomiting, dyspnoea, insomnia, appetite loss, and constipation), a financial difficulties scale, and an overall health and QOL scale (Aaronson et al., 1993). The questions have a 1-week time frame and use a four-point response format (i.e. 'not at all', 'a little', 'quite a bit' and 'very much'), except for the global health status scale, which is scored on a 1 (very poor) to 7 (excellent) scale. The raw scores were linearly transformed to a 0–100 scale, using the algorithm in the QLQ-C30 scoring manual (Fayers et al., 2001). Higher scores indicate a better level of function and QOL. For the symptom scales, higher scores indicate more severe symptoms. For this study the five function scales and the global health scale from the QLQ-C30 were used to evaluate QOL. Cronbach's alphas for the two QLQ-30 subscales used in this study that had more than two items (i.e. physical function and emotional function) were 0.78 and 0.80, respectively.

3.3 | Study procedures

Oncologists or nurses approached patients prior to the initiation of chemotherapy to assess their interest in study participation. Patients completed study questionnaires at the initiation of chemotherapy.

Research staff reviewed patients' medical records for disease and treatment information.

3.4 | Statistical analysis

Data were analysed using SPSS, Version 27 (IBM Corporation, Armonk, NY). Descriptive statistics were used to evaluate demographic and clinical characteristics, as well as QOL scores. One-sample t-tests were used to determine if the QLQ-C30 scores differed between the older gynecologic oncology patients and the Norwegian female GP who were ≥ 70 years of age (Fossa et al., 2007). A *p*-value of < 0.05 was considered statistically significant. To evaluate for clinically meaningful differences between the oncology patients' and the GP's QOL scores, effect size calculations were done (i.e. Cohen's *d*) and evaluated using the following cutoffs for small (0.20–0.49), medium (0.50–0.79) and large (> 0.80) effects (Cohen, 1988; Osoba, 2002; Sloan et al., 2006).

3.5 | Ethics

The Regional Committee for Medical and Research Ethics, Norway and the institutional review board at each of the study sites approved the study (reference No. 2015/1277/ REC South-East). Written informed consent was obtained from all patients.

4 | RESULTS

4.1 | Patient characteristics

As shown in Table 1, patients ($n = 122$) were 70.7 years (± 6.6); had a mean KPS score of 85.5 (± 10.8) and an average body mass index (BMI) of 26.1 (± 6.2). Almost two-thirds (63.2%) were married or partnered, 14.3% were currently employed and 31.8% had a college education. On average, the patients were 1.5 (± 3.8) years from their cancer diagnosis, half of the sample (49.2%) had surgery prior to chemotherapy and 37.7% were treated for recurrent disease. Most prevalent types of gynecologic cancer were ovarian, fallopian and peritoneal (65.6%) and 78.6% had metastatic disease. Mean number of comorbidities was 2.1 (± 1.2) and mean SCQ score was 3.9 (± 4.0). Most common comorbid conditions were osteoarthritis (44.0%), high blood pressure (39.1%) and back pain (36.5%).

4.2 | Differences in QLQ-C30 scores

Mean QLQ-C30 scores and standard deviations (SD) for the cancer patients and the Norwegian female GP ≥ 70 years of age (Fossa et al., 2007) are shown in Table 2. Compared to the Norwegian GP ≥ 70 years, oncology patients had a lower global health status score. Compared to the GP, except for the emotional function score, oncology

TABLE 1 Demographic, clinical and symptom characteristics of the older gynecologic oncology patients ($n = 122$)^a.

	Mean	SD
Age (years)	70.7	6.6
Karnofsky Performance Status score	85.5	10.8
Body mass index (kg/m ²)	26.1	6.2
Number of comorbidities	2.1	1.2
Self-Administered Comorbidity Questionnaire score	3.9	4.0
Time since cancer diagnosis (years)	1.5	3.8
Haemoglobin (g/dL)	12.6	1.7
	%	n
Married or partnered (% yes)	63.2	74
Lives alone (% yes)	34.5	40
Currently employed (% yes)	14.3	16
Education		
Primary school	17.8	19
High school	50.5	54
College	31.8	34
Specific comorbidities (% yes)		
Heart disease	12.1	13
High blood pressure	39.1	43
Lung disease	12.1	13
Diabetes	7.4	8
Ulcer or stomach disease	8.3	9
Bowel disease	8.3	9
Kidney disease	1.9	2
Anaemia/blood disease	3.8	4
Headache	9.5	10
Depression	10.4	11
Osteoarthritis	44.0	48
Back pain	36.5	38
Rheumatoid arthritis	3.8	4
Disease in connective-tissue	7.7	8
Skin disease	6.5	7
QLQ-C30 symptom scores		
Fatigue	46.5	26.8
Nausea and vomiting	9.3	15.9
Pain	34.6	29.5
Dyspnoea	21.1	28.9
Insomnia	26.5	29.8
Appetite loss	31.5	35.4
Constipation	30.0	33.0
Diarrhoea	13.6	25.8
Cancer diagnosis		
Ovarian, fallopian and peritoneal	65.6	80
Endometrial	32.0	39
Cervical	0.8	1
Vulva	0.8	1
Unknown origo	0.8	1

TABLE 1 (Continued)

	%	n
Surgery prior to chemotherapy (% yes)	49.2	60
Metastasis (% yes)	78.6	92
Treated for recurrent disease (% yes)	37.7	46
Type of prior cancer treatment (out of 46)		
Surgery (% yes)	90.9	40
Radiation (% yes)	15.9	7
Chemotherapy (% yes)	90.9	40
Other cancer treatment (% yes)	31.6	12

Abbreviations: dL, deciliters; g, grams; kg, kilograms; m², meters squared; SD, standard deviation.

^aResponses do not always total 122 because some questions were not answered by all of the patients.

patients reported lower scores for social, role, and physical function and higher cognitive function. Clinically meaningful differences range from $d = 0.28$ for cognitive function to $d = 0.62$ for social function.

5 | DISCUSSION

This study is the first to evaluate QOL in older gynecologic oncology patients (mean age 70.7 ± 6.6) at the initiation of chemotherapy and compare their scores with an age-matched sample from the female GP (Fossa et al., 2007), using a valid and reliable instrument (i.e. QLQ-30). Our a priori hypothesis, that older gynecologic oncology patients would have lower QOL (i.e. global health, and physical role, cognitive, emotional and social functions) than the GP at the initiation of chemotherapy, was partially supported. Except for cognitive and emotional function, the older gynecologic patients reported significantly lower scores than the GP.

The most important clinically meaningful finding was for the social function scores. Our sample reported scores that were well below the GP with a clinically meaningful difference that equated with a medium effect size (i.e. $d = 0.62$). While social function is measured with two items that evaluate the limitations that cancer places on the patients' social interactions (i.e. 'Has your physical condition or medical treatment disrupted your family life?', 'Has your physical condition or medical treatment disrupted your social activities?' (Aaronson et al., 1993)), this finding may reflect that half of the patients had undergone surgery shortly before the assessment. The time needed for postoperative recovery may have had an impact on the older patients' ability to socialise. This hypothesis is supported by a review of women undergoing surgery for gynecologic cancer (Martin et al., 2020), that noted associations between increasing age and more time needed for postoperative functional recovery.

It is interesting to note that our sample's mean social function score (i.e. 66.5) is consistent with findings in a previous study of frail older patients with heterogenous types of cancer (i.e. colorectal, lung, prostate, other gastrointestinal, breast and other); (i.e. 68.3) at the initiation of treatment (Kirkhus et al., 2019). In these two studies,

TABLE 2 Differences in European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (QLQ-C30) scores between older gynecologic oncology patients and the Norwegian general female population ≥ 70 years of age^a.

	Oncology patients <i>n</i> = 122		General population ^a <i>n</i> = 219		Difference between oncology patients and general population	Statistics		
	Mean	(SD)	Mean	(SD)		Mean	<i>p</i> -value	(CI for difference)
Global health status ^b	58.6	(23.3)	69.9	(25.8)	-11.3	<0.001	(-15.66, -6.87)	0.48
Function scales ^b								
Physical	67.7	(21.3)	74.9	(22.2)	-7.2	0.001	(-11.2, -3.17)	0.34
Role	58.5	(31.1)	75.5	(29.8)	-17.0	<0.001	(-22.89, -11.14)	0.55
Emotional	81.2	(18.6)	82.5	(21.1)	-1.3	0.469	(-4.85, 2.25)	0.07
Cognitive	86.1	(17.0)	81.3	(21.3)	+ 4.8	0.004	(1.55, 7.97)	0.28
Social	66.5	(27.4)	83.6	(24.7)	-17.1	<0.001	(-22.27, -11.9)	0.62

Abbreviations: CI, confidence interval; SD, standard deviation.

^aFossa et al. (2007).

^bHigher scores indicate better global health status and function.

the majority of the patients had metastatic disease (i.e. 78.6% and 87%, respectively). In contrast, in two studies that evaluated QOL in older patients with early stage breast cancer prior to adjuvant treatment (Arraras et al., 2019; Hurria et al., 2019), clinically meaningful better social function scores (>10 points (Osoba, 2002); i.e. 87.3 and 92.2, respectively) than our sample were reported. It is possible that the advanced stage of disease in our patients had a significant impact on their social functioning. Given that poorer social function scores at the initiation of treatment are associated with decreased survival in patients with advanced cancer (Efficace et al., 2008), our finding suggests that social function needs to be monitored and addressed in older gynecologic patients prior to chemotherapy.

Consistent with prior reports of younger patients with gynecologic cancer (Bezjak et al., 2004; Brotto et al., 2016; de Boer et al., 2016; Greimel et al., 2013; Sorbe et al., 2012), the lowest of the five function scores reported by our older gynecologic patients was for role functioning. The two QLQ-C30 role function items assess complex tasks that are necessary to maintain activities like work, hobbies and sports (Aaronson et al., 1993). Taken together with the findings on social functioning, these results suggest that patients with gynecologic cancer experience significant limitations in two important dimensions of QOL.

While the older gynecologic patients reported comparable role function scores with frail older cancer patients (Kirkhus et al., 2019) (i.e. 58.5 and 52.0, respectively), they were significantly lower than the Norwegian GP with a medium effect size (i.e. $d=0.55$). In contrast, older women with breast cancer (Arraras et al., 2019; Hurria et al., 2019) reported clinically meaningful higher role function scores (i.e. 89.7 and 84.8, respectively) (Osoba, 2002). One plausible explanation for these inconsistent findings is that the older patients with breast cancer (Arraras et al., 2019; Hurria et al., 2019) reported significantly lower fatigue and pain scores than our sample and the sample of frail older patients (Kirkhus et al., 2019). This hypothesis is supported by a reported association between higher symptom burden (i.e. fatigue and pain) and functional impairment (Pandya

et al., 2019). In addition, in a narrative review, higher levels of fatigue were associated with lower levels of function (Soones et al., 2022). These findings suggest that clinicians need to evaluate older gynecologic oncology patients' level of fatigue and pain at the initiation of treatment and initiate appropriate proactive management.

While physical function and role function are two related dimensions of functional status (Aaronson et al., 1993), it is surprising that the mean physical function score for our sample was below the age-matched female GP's mean score (Fossa et al., 2007), with a difference of only small clinical importance (i.e. $d=0.34$). While the Norwegian normative data were collected in 2004 and physical function among the older adults has increased during the past decades (Koivunen et al., 2020; Santoni et al., 2018), a larger difference in physical function scores may be found with data from the current GP. Consistent with previous comparisons with older patients with breast cancer (Arraras et al., 2019; Hurria et al., 2019), their mean physical function scores before adjuvant cancer therapy were significantly higher than our sample (i.e. 17.4 (Arraras et al., 2019) and 18.7 (Hurria et al., 2019)).

It is interesting that our sample, with an average of two comorbidities, reported physical function scores that were similar to frail, older cancer patients (Kirkhus et al., 2019). The physical functioning domain evaluates basic actions and activities that are essential for self-care (e.g. walking and routine activities of daily living). Maintaining optimal physical function is crucial for independent living, which is a high priority for older patients (Fried et al., 2002; Soto-Perez-De-Celis et al., 2018). A higher level of comorbidity is associated with declines in functional status and subsequent impairments in individual's ability to perform routine activities of daily living (Grosv et al., 2009, 2010). Our patients' score on SCQ-16 suggests a relatively low comorbidity burden. Nonetheless, two of the three most common comorbidities reported by our sample were painful conditions associated with functional impairments (i.e. osteoarthritis and back pain). While the prevalence of comorbidity increases substantially with age and is present in most people ≥ 65 years of age

(Barnett et al., 2012; Meraner et al., 2012), clinicians need to assess patients' comorbidity burden and its impact on physical function and initiate referrals to physical therapy.

In terms of the cognitive function, surprisingly our sample's score was higher than the age-matched female GP (Fossa et al., 2007). However, the effect size was small (i.e. $d=0.28$). Similar to physical function, improvements in cognitive performance have occurred in the older population in the last decade (Munukka et al., 2021), which suggests that our findings may be different with updated GP data. Cognitive function is measured with two items (i.e. 'Have you had difficulty in concentrating on things, like reading a newspaper or watching television?' and 'Have you had difficulty remembering things?' (Aaronson et al., 1993)). While older adults are at increased risk for cognitive impairments (Vega et al., 2017), it is interesting to note that our patients' cognitive function scores are comparable to those reported by other older oncology patients (Kirkhus et al., 2019). This finding may be explained by the fact that we included patients with good cognitive function (i.e. MoCa score ≥ 23).

Contrary to our expectations, no difference in emotional function scores were found between our sample and the GP (Fossa et al., 2007) (i.e. 81.2 vs. 82.5, respectively) or with another sample of older cancer patients (i.e. 83.9; Kirkhus et al., 2019). This finding may be explained by the phenomenon of a response shift, commonly observed in cancer patients (Sprangers & Schwartz, 1999). It is possible that the distress associated with their cancer diagnosis, which on average occurred 1.5 ± 3.8 years prior to this assessment, caused our patients to engage in cognitive reframing of their circumstances to ease the psychological distress they were experiencing (Visser et al., 2013) and/or they had received appropriate referrals to mental health professionals for treatment.

Consistent with evidence that suggests that emotional well-being improves with age (Carstensen et al., 2011; Gil et al., 2007; Nolte et al., 2019), it is interesting to note that our older patients' score for emotional function, measured with four items rating worrying and the feelings of anxiety, irritability, and depression (Aaronson et al., 1993), is higher compared to younger gynecologic oncological patients prior to chemotherapy (i.e. 57.2–72.9) (Bezjak et al., 2004; Brotto et al., 2016; Greimel et al., 2013; Sorbe et al., 2012).

Consistent with our hypothesis, our sample rated their global health status lower than the female, age-matched GP with a moderate effect size (i.e. $d=0.48$) (Fossa et al., 2007). This finding is not unexpected given the scores reported for the social, role and physical function. In addition, it is congruent with a study of younger patients with advanced hepatocellular cancer that found moderate correlations between global health status and role function and physical function scores, and a small correlation between global health and social function scores (Phillips et al., 2015).

5.1 | Strengths and limitations

Several study limitations warrant consideration. Our sample was relatively small and comprised of heterogeneous gynecologic cancer

diagnoses. In addition, we compared our sample with data from the female GP ≥ 70 years old collected in 2004. Because improvements in QOL were found in the Norwegian GP between 1996 and 2004 (Fossa et al., 2007), and the fact that the current older population demonstrates better physical (Koivunen et al., 2020) and cognitive (Munukka et al., 2021) function it is possible that the current GP ≥ 70 years of age would have a higher QOL. Despite these limitations, this study is the first to evaluate QOL in a relatively large sample of older patients with gynecologic cancer at the initiation of chemotherapy and to compare these patients' QOL scores with an age-matched sample from the GP. Given the paucity of research on the QOL of older gynecologic oncology patients, the findings from this study can be used by clinicians to guide their assessment of these vulnerable women.

6 | CONCLUSION

Findings from this study, suggest that except for emotional function, compared with the GP, older gynecologic oncology patients have clinically meaningful decrements in multiple dimensions of QOL. Given that these findings are based on an assessment of QOL that was done prior to the initiation of chemotherapy and that chemotherapy can have a negative impact on decrements in QOL (Jones et al., 2006), clinicians need to evaluate older patients for additional decrements in various domains of QOL.

AUTHOR CONTRIBUTIONS

Anne Grethe Kleven: Design of the study, acquisition of data, analysis and interpretation of data, drafting the manuscript, review and editing draft, final approval, agreed to be accountable. Christine Miaskowski: Conception and design, investigation, formal analysis, review and editing draft, final approval, agreed to be accountable. Ann Helen Torstveit: Conception and design, acquisition of data, review and editing draft, final approval, agreed to be accountable. Christine Seel Ritchie: Conception and design, review and editing draft, final approval, agreed to be accountable. Marie Ellström Engh: Acquisition of data, review and editing draft, final approval, agreed to be accountable. Elin Andersen: Acquisition of data, review and editing draft, final approval, agreed to be accountable. Inger Utne: Conception and design, funding acquisition, acquisition of data, analysis and interpretation of data, drafting the manuscript, project administration, review and editing draft, final approval, agreed to be accountable.

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CONFLICT OF INTEREST STATEMENT

The authors have no funding or conflicts of interest to disclose.

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