Determinants of quality of life among Omani family caregivers of adult patients with cancer pain

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Original Article

Abstract

Objectives. The study aimed to explore the determinants of quality of life (QoL) among Omani family caregivers (FCGs) of adult patients with cancer pain.

Methods. A descriptive cross-sectional design, measures of caregiver reaction, knowledge about cancer pain, self-efficacy for cancer pain and other symptom management, QoL, and patient functional status were used to collect data from 165 FCGs and patients. Descriptive, correlation, and regression analyses were performed.

Results. Most patients had intermittent (83%) and severe (50.9%) cancer pain. The FCGs had low QoL (58.44 ± 17.95), and this mostly impacted support and positive adaptation (55.2%). Low QoL was associated with low self-rated health, low confidence in the ability to control the patient's pain, low self-efficacy, high perceived distress due to patient pain, and a high impact of caregiving on physical health. The level of caregiver distress due to the patient's pain ($p < 0.01$), patient's functional status ($p < 0.01$), and perceived impact of caregiving on health ($p < 0.05$) were significant predictors of overall QoL.

Conclusion. Omani FCGs of patients with cancer pain suffer a negative impact on their QoL, and this is related to the patient's level of pain and functional status, caregiver's health, and self-efficacy in cancer pain and symptom management. The FCGs' QoL may be enhanced by augmenting their skills and self-efficacy in cancer pain and symptom management and by health promotion programs.

Introduction

The worldwide burden of cancer disease is projected to increase to 28.4 million new cancer cases by the year 2040, representing a 47% increase from the 19.3 million recorded in 2020 (Sung et al. 2021). The escalation is mainly due to the increasing aging population and cancer risk factors that are present in low, middle, and high human development index (HDI) countries (Sung et al. 2021). The projected increase in cancer burden is likely to have a more severe impact in countries with health-care systems with less established cancer care services. Escalation in cancer disease burden leads to increased demands on cancer health-care services and family resources (Yun et al. 2005; Zafa et al. 2019).

In the cancer care system and disease trajectory, the only resource that is constantly utilized from the time of diagnosis to remission, or death, is the family caregivers (FCGs). The FCGs play a central role in cancer care, and unlike the other personnel involved in caring for cancer patients, FCGs perform their roles without any prior training or formal support. Consequently, the FCGs get heavily burdened with caregiving responsibilities, while at the same time continuing to provide physical, emotional, and practical support to cancer patients (Thomas et al. 2021).

In many countries where the cancer burden is high and projected to increase, the health-care systems provide no formal programs to support the FCGs or to evaluate their needs or quality of life (QoL). The lack of such efforts is troubling, considering the upward trends of cancer disease, and findings showing that unmet physical and psychological needs have a high impact on the FCG' QoL (Cochrane et al. 2022). The current study was conducted in Oman, a high HDI country, with increased cancer incidence and a health-care system in the process of establishing cancer care services (Al-Lawati et al. 2019).

There are no prior studies about the QoL of FCGs of adult cancer patients in Oman. The country (Oman) has a population of approximately 5.46 million people, and the age-adjusted annual incidence of cancer ranges from 70 to 110 per 100,000 (Mehdi et al. 2022). The upward trends in cancer incidence are expected to continue due to an aging population (Al-Lawati et al. 2019). In response to the cancer trends, the country has expanded its cancer services by opening a new cancer treatment center in the capital city, with services that primarily focus

on diagnostics, therapeutics, and research (Al Farai et al. 2022). The country has clinics for cancer survivors and plans to establish programs focusing on home health, caregiver education, and supportive care (Mehdi et al. 2022). There was no active home health or supportive care program for FCGs in Oman at the time of this study.

In Oman, all citizens have access to free cancer care services provided by the public health-care system, but the increasing number of cancer patients is escalating the costs associated with this type of health care (Mehdi et al. 2022). The economic pressures have propelled the country to embark on strategies that ensure cost-effective care and prompt management of cancer and equitable resource allocation (Mehdi et al. 2022). Some of the strategies that have been emphasized include cancer prevention, screening, genetic screening, and increasing the number of patients who receive cancer care in outpatient units (Mehdi et al. 2022).

The shift from inpatient to majority outpatient cancer care has shifted more burden related to cancer patient care to the family and FCGs. In Oman, the caregiving burden among FCGs is not well known, but studies conducted in other countries in the middle east show that the health-care systems in the region pay suboptimal emphasis on supportive care for cancer patients (Keefe et al. 2016). Supportive care in cancer includes the management of physical and psychological symptoms and side effects from diagnosis through treatment to posttreatment care, and this care helps to curtail some of the challenges faced by FCGs (Keefe et al. 2016). Some FCGs of cancer patients in this region have been reported to face more challenges in the caregiving role due to their spirituality (Nemati et al. 2017; Nikseresht et al. 2016). A study conducted in Iran showed that FCGs of cancer patients tend to have a spiritual crisis and suffer spiritual distress due to beliefs that cancer disease happens as a way for the patient to compensate for past deeds and behaviors, experience disappointments, and feel deprived of divine attention (Nemati et al. 2017). Islamic culture and religious beliefs are predominant in both Iran and Oman.

In Oman, a recent study showed that cancer patients reported that they received low- to moderate-quality oncology nursing care, especially in the domain of religious and spiritual care (Sharour et al. 2022). Available literature also shows that FCGs of cancer patients in Oman are exposed to risks associated with oral anticancer agents since a large number are involved in administering the medication at home, but 42% forget to wash their hands with soap after administering oral chemotherapy (Hassan et al. 2021). The reports of low-quality oncology nursing care and unsafe practices among FCGs may be indicators of suboptimal support for cancer patients and their FCGs. Inadequate support for cancer patients and their FCGs may escalate the caregiving burden, and patient's symptoms, and can lead to a negative impact on the caregiver's QoL. This study aimed to explore the determinants of QoL among Omani FCGs of adult patients with cancer pain.

Methods

Participants

A descriptive cross-sectional design was used to collect data from a sample of 165 FCGs (see Figure 1) and their adult patients with cancer and receiving care at the National Oncology Centre (NOC) in Oman. There were no prior studies conducted in Oman among FCGs of adult cancer patients that could be used to estimate the effect size. To reliably explore the predictors of QoL, the *F*-test for multiple regression was planned and the level of significance was set at 0.05. Using settings of a minimum power of 0.80, a minimum effect size of 0.2, 10 potential predictors, and an acceptable type 1 error with an alpha of 0.05, the G-power software estimated the required minimum sample to be 114.

The patients were individuals of age ≥ 18 years with a confirmed diagnosis of cancer (any type of cancer), receiving treatment for cancer pain, and in a condition stable enough to give consent for the study. The FCGs were individuals responsible for providing regular care and assistance to the patient during medical appointments, personal care, pain and related symptom management, and other activities when the patient is at home or in the hospital. The FCG was identified by the patient as the primary caregiver at home and had to be of age ≥ 18 years, able to speak English or Arabic, and have been in the caregiver role for at least 1 month. Individuals hired to help the family with caregiving responsibilities were excluded. The patient and FCGs were recruited consecutively through the different units of the NOC (the center receives patients from all regions of Oman).

Procedures

The study was approved by the Research and Ethics Committee of the university and the hospital system responsible for the NOC. The research assistants (RAs) identified eligible participants with the assistance of the nursing staff of the NOC. The participants were approached when they came seeking health care or follow-up care at the NOC. The RAs (all registered nurses) requested each patient to identify their primary caregiver. Written consent was obtained from the patients and their caregiver before data collection. A total of 265 eligible patients and their FCGs were approached and 165 (62.3%) agreed to participate (see Figure 1).

Variables and measures

A patient data sheet and the interview questionnaire (IQ) were used for data collection. The patient data sheet was used to collect data about the patient's current level of pain, cancer-related symptoms and complaints present when the patient is at home, stage of cancer when it was first diagnosed, current cancer treatment, time since the cancer was first diagnosed, and length of time since cancer pain started or pain medication was started. The above data was obtained from the patient's electronic medical record (the patient's electronic medical record is updated during each patient visit).

The IQ was used to collect data from FCGs and comprised the patient's and FCGs' demographic characteristics, the Katz index (Katz et al. 1970), the Caregiver Reaction Assessment (CRA) (Given et al. 1992), the Family Pain Questionnaire (FPQ) (Ferrell et al. 1993), the modified caregiver cancer pain and other symptom management self-efficacy scale (CPSS) (Anderson et al. 1995), one-item measuring the FCGs' self-rated health, and the Caregiver Quality of Life Index–Cancer Scale–Persian Version (CQOLC) (Khanjari et al. 2011).

The Katz index (6 items) measures patients' functional status by assessing their ability to independently perform the activities of daily living (Katz et al. 1970). The CRA has a subscale (5 items) that measures the impact of caregiving on physical health status (Given et al. 1992). The CRA subscale was used to measure the impact of caregiving on the FCGs' physical health. A high total score on the Katz index and CRA indicates a high functional status and a greater impact of caregiving on physical health, respectively.
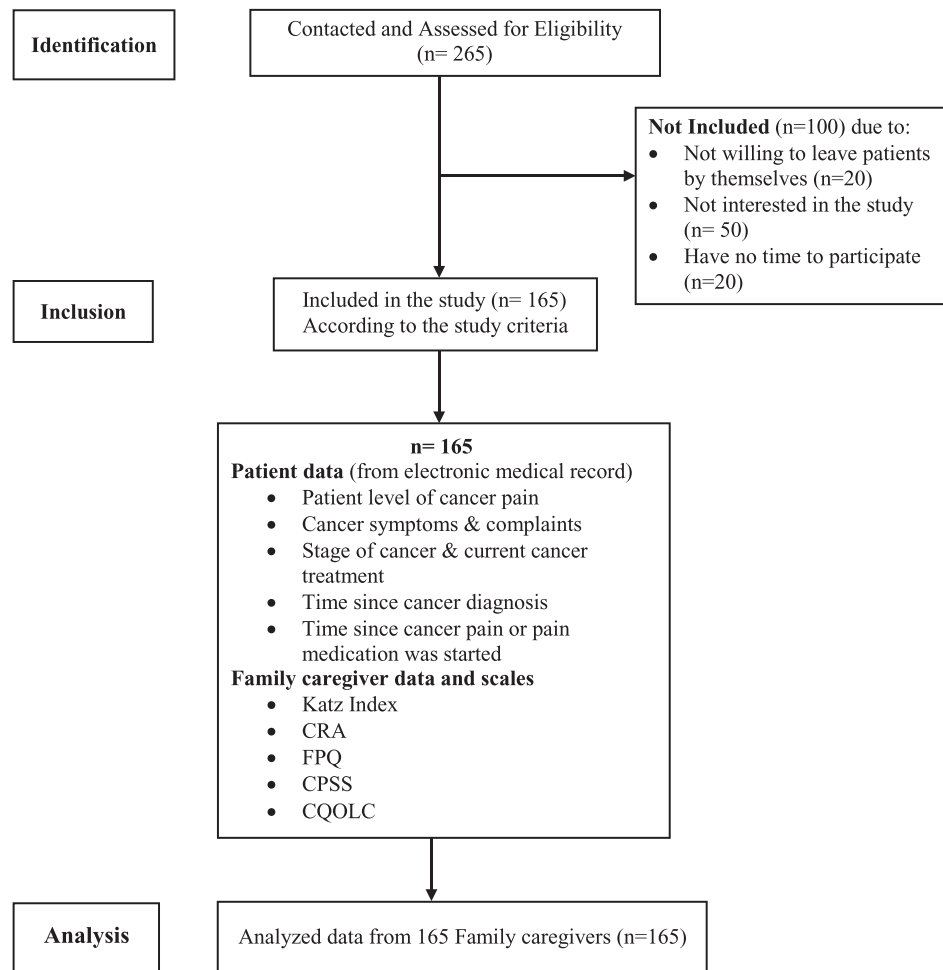
Fig. 1. Flow chart for inclusion and exclusion of participants.

The Cronbach's alpha of the Katz index and CRA in the current study were 0.92 and 0.72, respectively.

The FCGs' current self-rated health was measured using an item anchored on 2 extreme values of 1 to 10 ("1 = very healthy" to "10 = very ill") assessing current health as compared to health at the same time in the past year. A score of 6 or higher indicates distressed health status. The FCGs also responded to 3 items measuring the level of distress caused by cancer pain to the patient (on a scale of "0 = no distress" to "10 = a great deal of distress"), the level of distress caused by the patient's pain to the FCG (on a scale of "0 = no distress" to "10 = great deal of distress"), and the FCG's confidence in their ability to control patient's pain (on a scale of "0 = no confidence at all" to "10 = great deal of confidence").

The knowledge subscale of the FPQ was used to measure the FCGs' knowledge about cancer pain management (Ferrell et al. 1993). The FCGs' responses are recorded using a 10-point scale with "0" as the most positive outcome and "10" as the most negative outcome (extent of agreement or disagreement with a given statement). The total scores (10 items) range from 0 to 100. The CSPP (16 items) was used to rate the FCGs' self-efficacy to support patients and manage their cancer pain and cancer symptoms (Anderson et al. 1995; Campbell et al. 2004; Porter et al. 2008). The participants' responses were recorded using a 10-point Likert scale

(10 = "very uncertain" and 100 = "very certain"). High total scores indicate a greater self-efficacy for pain and related symptom management. In the current study, Cronbach's alpha of the CPSS and FPQ were 0.93 and 0.50, respectively.

The CQOLC was used to assess the QoL of FCGs (Khanjari et al. 2011; Weitzner et al. 1997). The CQOLC (35 items) has 4 subscales of mental/emotional burden (14 items), lifestyle disruption (9 items), positive adaptation (8 items), and financial concern (3 items) and 1 item about the family interest that is not part of any subscale (Khanjari et al. 2011). The responses were recorded using a 5-point Likert scale ranging from 0 (not at all) to 4 (very much), and high total scores reflect better QoL (range from 0 to 140). The Cronbach's alpha of the CQOLC was 0.82 in the current study.

Analysis

Data were analyzed using the Statistical Package for Social Sciences software version 23 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used to describe the sample, FCGs' knowledge, self-efficacy, physical well-being, and the caregivers' QoL. The Shapiro–Wilk test confirmed that overall CQOLC scores were normally distributed. The mean score of the CQOLC and its domains was used as a cutoff point to form a binary outcome. The chi-square

Table 1. Characteristics of family caregivers

Variable	Sample (n = 165), %	Level of quality of life		Chi-square	p-Value
		Low (n = 79), %	High (n = 86), %		
Gender					
Male	41.82	37.97	45.34	0.92	0.35
Female	58.18	62.02	54.65		
Level of education					
≤Elementary school	8.48	7.59	9.30	2.44	0.30
High school	38.79	32.91	44.19		
≥Associate degree	52.73	59.49	46.51		
Marital status					
Single	31.52	22.78	39.53	5.38	0.07
Married	64.24	72.15	56.98		
Widowed/divorced/separated	4.24	5.01	3.49		
Employment status					
Full time	38.18	40.51	36.05	0.11	0.95
Part-time	6.06	6.33	5.81		
Not employed	55.76	53.16	58.14		
Relationship with the adult cancer patient					
Child	53.94	55.69	52.32	0.72	0.70
Spouse	15.15	16.46	13.95		
Others[a]	30.91	27.85	33.72		
	M ± SD	M ± SD	M ± SD	*t*-Test	p-Value
Age (years)	38.84 ± 10.29	33.45 ± 10.40	36.35 ± 10.01	1.822	0.07
Length of time as a caregiver (months)	11.16 ± 11.03	11.97 ± 11.93	10.28 ± 9.96	0.981	0.328
Number of caregiving hours per week	36.36 ± 92.23	40.84 ± 43.20	32.23 ± 34.94	1.413	0.163
Self-rated health at the same time 1 year ago	2.45 ± 1.88	2.91 ± 2.132	2.02 ± 1.51	3.107	0.002
Impact of caregiving on physical health	13.27 ± 2.38	13.76 ± 2.48	12.83 ± 2.19	2.566	0.011

M, mean; and SD, standard deviation.
[a]Includes neighbor, mother, in-law, friend, grandchild, and niece.

test and *t*-test were used to examine the factors associated with overall QoL and the 4 domains of QoL. Linear regression analysis was used to examine the predictors of QoL. The level of significance was set at $p \leq 0.05$.

Results

Participants

The results presented in Table 1 show that most of the FCGs were female (58.2%), married (64.2%), and a child of the cancer patient (53.9%). The caregiving role was almost a full-time job (36.36 ± 92.23 hours per week), and on average, the FCGs had been in this situation for 11.16 ± 11.03 months. Most of the FCGs had high self-rated health (94.5%) but a

large number (41.2%) reported a high impact of caregiving on their physical health. The FCGs with overall low QoL reported significantly lower mean self-rated health ($p = 0.002$) and a significantly higher mean impact of caregiving on physical health ($p = 0.011$).

The cancer patients were mostly female (75.2%), diagnosed with stage 3 or 4 cancer (58.79%), and on chemotherapy (57.6%) (see Table 2). The majority of patients reported having intermittent pain (83%), and the pain was rated as severe (50.9%) (Table 3). A significantly higher number of FCGs with low QoL were taking care of a patient with severe cancer pain (55.7%) compared to FCGs with high QoL (46.5%) ($p = 0.040$). Additionally, FCGs with low QoL were taking care of patients with lower functional status (4.64 ± 2.14) compared to FCGs with a high QoL (5.51 ± 1.36) ($p = 0.002$).

Table 2. Characteristics of cancer patients

Variable	Sample ($n = 165$), %	Level of quality of life		Chi-square	*p*-Value
		Low ($n = 79$), %	High ($n = 86$), %		
Gender					
Male	24.85	22.79	26.74	0.346	0.557
Female	75.15	77.21	73.26		
Level of education					
≤Elementary school	21.21	37.97	5.81	5.452	0.065
High school	64.24	51.90	75.58		
≥Associate degree	14.55	10.13	18.61		
Marital status					
Single	10.30	11.39	9.30	2.867	0.238
Married	63.03	56.96	68.61		
Widowed/divorced/separated	26.67	31.65	22.09		
Stage of cancer disease at first diagnosis					
Stage 1	8.48	6.33	10.47	1.249	0.870
Stage 2	13.33	12.66	13.95		
Stage 3	22.42	22.78	22.09		
Stage 4	36.36	39.24	33.72		
Cannot be staged	19.39	18.99	19.77		
Current type of cancer treatment					
No active treatment	7.88	7.59	8.14	0.589	0.964
Radiotherapy	7.27	6.33	8.14		
Chemotherapy	57.58	68.35	47.67		
Palliative care	26.67	17.72	36.05		
	M ± SD	M ± SD	M ± SD	*t*-Test	*p*-Value
Age (years)	51.74 ± 17.85	53.84 ± 18.67	49.76 ± 16.92	1.448	0.151
Time since the cancer was first diagnosed (months)	38.78 ± 28.85	37.77 ± 28.25	39.70 ± 29.52	−0.427	0.670

M, mean; and SD, standard deviation.

Knowledge about cancer pain and self-efficacy for cancer pain and symptom management

The FCGs' mean score for knowledge about cancer pain management (46.21 ± 14.91) was equivalent to moderate knowledge score (see Table 4). There were no significant differences in knowledge scores between FCGs with low and high QoL. The mean CPSS score shows that the FCGs had moderate self-efficacy (892.9 ± 296.20). The FCGs with a high QoL had significantly higher self-efficacy compared to those with a low QoL ($p = 0.009$). All the FCGs reported that cancer pain was distressing to them (mean $= 6.85 \pm 3.29$) and the patients (mean $= 6.74 \pm 3.11$). The reported level of distress due to cancer pain was significantly higher among FCGs with low QoL ($p = 0.000$) and patients who were cared for by FCGs with low QoL ($p = 0.013$). On the other hand, FCGs with a higher QoL were significantly more confident in their ability to control the patient's pain when compared to those with a low QoL ($p = 0.013$).

Family caregiver's quality of life

The results presented in Table 5 show an almost even split between the number of FCGs found to have low (48%) and high (52%) QoL. However, overall the FCGs had a low QoL (58.44 ± 17.95). The majority of FCGs reported having a high QoL in the domains of mental/emotional burden (57.6%) and financial strain (67.9%). The domain of QoL in which the majority of FCGs had low QoL scores was support and positive adaptation (55.2%).

Predictors of family caregivers' quality of life

The regression analysis (see Table 6) shows that the level of distress faced by FCGs due to the patient's pain ($p < 0.01$), patient's functional status ($p < 0.01$), and the FCGs' perceived impact of caregiving on their health ($p < 0.05$) were significant predictors of overall QoL and accounted for 23.1% of the variance in the overall QoL ($p < 0.01$). The significant predictors of mental

Table 3. Patients' cancer pain and functional status

| Item | Sample (n = 165), % | Level of quality of life | | Chi-square | p-Value |
		Low (n = 79), %	High (n = 86), %		
Regularity of pain					
All the time	16.97	20.25	13.95	1.687	0.194
Intermittently	83.03	79.75	86.05		
Ranking of patient pain level					
Mild	10.91	6.33	15.12	8.329	0.040
Moderate	38.18	37.97	38.37		
Severe	50.91	55.70	46.51		
Patient gets pain relief with pain medications					
Yes	76.36	79.75	73.26	0.961	0.327
No	23.64	20.25	26.74		
Family caregiver receives help from other family members to assist with caregiving					
Yes	86.67	83.54	89.53	1.279	0.258
No	13.33	16.46	10.47		
	M ± SD	M ± SD	M ± SD	t-Test	p-Value
Length of time the patient has been having pain (months)	8.49 ± 6.68	8.77 ± 14.75	8.19 ± 10.20	0.252	0.801
Patient's level of pain	3.91 ± 3.09	4.35 ± 3.08	3.50 ± 3.07	1.785	0.076
Patient functional status (Katz index)	5.10 ± 1.82	4.64 ± 2.14	5.51 ± 1.36	−3.134	0.002

M, mean; and SD, standard deviation.

Table 4. Caregivers' knowledge and self-efficacy in cancer pain and symptom management

| Variable | Range | Sample (n = 165), M ± SD | Level of quality of life | | t-Test; p-value |
			Low (n = 79), M ± SD	High (n = 86), M ± SD	
Family caregivers' knowledge of cancer pain management	0–100	46.21 ± 14.91	48.01 ± 15.88	44.56 ± 13.83	t = 1.493; p = 0.137
Family caregivers' self-efficacy in cancer pain and related symptom management	160–1600	892.9 ± 296.20	830.63 ± 257.68	950.0 ± 318.53	t = 2.632; p = 0.009
On a scale of 0 to 10, how distressing is the cancer pain to the patient?	0–10	6.74 ± 3.11	7.47 ± 2.83	6.07 ± 3.22	t = 2.955; p = 0.004
On a scale of 0 to 10, how distressing is the patient's pain to you (family caregiver)?	0–10	6.85 ± 3.29	8.03 ± 2.48	5.77 ± 3.58	t = 4.669; p = 0.000
On a scale of 0 to 10, to what extent do you feel you are able to control the patient's pain?	0–10	5.36 ± 3.082	4.79 ± 3.10	5.97 ± 2.96	t = 2.504; p = 0.013

M, mean; and SD, standard deviation.

and emotional burden were the level of distress faced by FCGs due to the patient's pain ($p < 0.01$), patient's functional status ($p < 0.01$), the perceived impact of caregiving on the FCGs' health ($p < 0.05$), and self-efficacy ($p < 0.05$), and these 4 factors were responsible for 26.1% of the variance in this domain ($p < 0.01$).

The predictors of lifestyle disruption were the level of distress faced by FCGs due to patient's pain ($p < 0.01$) and self-rated health ($p < 0.01$), and these 2 factors accounted for 16.7% of the variance in lifestyle disruption ($p < 0.01$). The predictors of positive adaptation were the level of distress faced by FCGs due to the patient's pain ($p < 0.01$) and self-efficacy ($p < 0.01$), and both these factors

FCGs in the Netherlands (mean = 49.4 ± 20.04) (Decadt et al. 2021).

Studies measuring FCGs' QoL using the CQOLC conducted in Singapore (mean = 86.5 ± 24.1), Canada (mean = 82.1 ± 20), Malaysia (mean = 80.17), and Uganda (mean = 70.2 ± 20.3) found higher levels of QoL than ours (Abdullah et al. 2019; Duimering et al. 2020; Kizza and Muliira 2020; Leow et al. 2014). Unlike in Oman, cancer patients in the above-highlighted countries have access to established palliative care programs. The studies conducted in Singapore, Canada, and Uganda included a large number of FCGs caring for adult cancer patients receiving some form of palliative care services.

Similar to other studies, the caregivers' QoL was most negatively impacted in the domains of support and adaptation (Ochoa et al. 2020). This finding confirms that access to supportive care is essential for the well-being of FCGs of adult cancer patients. The findings of a high negative impact on support and positive adaptation have also been reported in Uganda and Malaysia (Abdullah et al. 2019; Kizza and Muliira 2020). On the contrary, a study involving Turkish FCGs of cancer patients found that psychological health, spiritual health, and physical health were the most negatively impacted domains (Üzar-Özçetin and Dursun 2020). While in Saudi Arabia, a study of QoL among FCGs of cancer patients (Short-Form Health Survey SF-36) found high scores of QoL and better functioning in the domains of physical functioning, role functioning, and emotional well-being, but moderate to low in the domains of energy/fatigue and general health (Almutairi et al. 2017).

The majority of FCGs in the current study had high QoL scores in the domains of mental/emotional burden and financial strain. This finding is not surprising considering Oman's extended family traditions and culture, high HDI status, and access to free cancer care services provided by the public health-care system (Mehdi et al. 2022). In Oman, the family members are highly involved in patient care and many times take up full control of the treatment decision-making for the cancer patient because social norms expect the acquisition of these duties when a family member is in poor health (Al-Bahri et al. 2018). A recent study of Omani cancer patients and their FCGs showed that a large number have positive and supportive attitudes toward cancer patients and only feel social obstacles when planning for the marriage of a person with a history of cancer diagnosis (Al-Azri et al. 2021).

Overall, the FCGs in our study had moderate knowledge about cancer pain (46.21 ± 14.91) and moderate self-efficacy in cancer pain and related symptom management (892.9 ± 296.20), but this may be suboptimal since a large number were taking care of a patient with severe cancer pain (50.9%). Additionally, FCGs with low QoL reported lower mean self-rated health, lower mean self-efficacy, and less confidence in their ability to control the patient's cancer pain. The FCGs with low QoL also tended to be those caring for a patient with severe cancer pain and low functional status and reported higher levels of distress due to the patient's cancer pain and a high impact of caregiving on their physical health. The above findings suggest that the caregivers' QoL is affected by the patient's cancer pain, the patient's functional status, and the caregivers' self-efficacy for cancer pain and related symptom management.

This study shows that the modifiable predictors of FCGs' overall QoL were the level of distress faced by FCGs due to the patient's cancer pain ($p < 0.01$), patient's functional status ($p < 0.01$), and perceived impact of caregiving on FCGs' health ($p < 0.05$). Other studies show that taking care of patients in active cancer treatment, a spouse/partner relationship with the caregiver, living with the patient (Decadt et al. 2021), knowledge about cancer pain management, and self-efficacy for pain management are significant predictors of caregivers' overall QoL (Kizza and Muliira 2020).

The other factors associated with the different domains of QoL such as the FCGs' self-efficacy in cancer pain and related symptom management and caregiver self-rated health are similar to what has been reported in other studies. For instance, a longitudinal study showed that distress in spousal caregivers is associated with a high level of distress among cancer survivors (Milbury et al. 2013), and high scores in QoL aspects such as bodily pain, vitality, social activities, and mental health are associated with spiritual well-being (Spatuzzi et al. 2019). A study of FCGs of patients with advanced cancer and receiving home hospice in Singapore found that the main predictors of QoL improvement were caregivers' satisfaction with social support, religiosity, and changes in the patient's condition (Leow et al. 2014). It is also important to note that a low QoL among cancer caregivers is associated with poor patient performance status and expression of interest in more support services (Duimering et al. 2020).

Overall, our study shows that a large number of Omani FCGs of adult patients with cancer pain have a low QoL. Understanding the intricacies of the QoL of FCGs of cancer patients and the associated factors in countries such as Oman with health-care systems that are still developing is essential because it directs us to critical interventions that can enhance the patient, caregiver, and health-care system outcomes. For instance, the association between the caregiver QoL and factors such as FCGs' health status, FCGs' self-efficacy for cancer symptom management, patient's cancer pain, and patient's functional status demonstrates that health promotion for FCGs, education, and training to enhance self-efficacy in pain and symptom management, and other caregiving skills, can positively augment outcomes of the clients and health-care system.

Therefore, a supportive care program that assesses, educates, empowers, and assists cancer patients and their caregivers can mitigate many of the negative outcomes of FCGs (Berry et al. 2017). Other studies have shown that the main caregiver-identified priorities in cancer care for their patients are those that focus on training the caregiver, the health and well-being of the caregiver, and policy reforms to address caregiver needs (Thomas et al. 2021). The findings of our study support these priorities. Additionally, we recommend additional studies to develop and calibrate supportive care interventions focusing on health promotion for FCGs and strategies for equipping FGCs with knowledge and skills in cancer pain and symptom management while at home. The availability of such evidence-based interventions will enable countries with underdeveloped cancer care systems to address the existing and future caregiving-related outcomes despite the increasing cancer burden.

Strength and limitation

This study is the first to explore the QoL of FCGs of adult cancer patients in Oman. The study used standardized scales to measure the FCGs' QoL, self-efficacy, and knowledge about cancer pain management at home, but has limitations that need to be considered before generalizing the findings to all FCGs in Oman. For instance, the used nonrandom sample and the reliability of the FPQ was low. The data were collected during the follow-up care visits or when seeking health care rather than in the home care setting, and this could have affected the FCGs' perception of their QoL and other variables. Finally, psychological variables, such as depression

and anxiety, were not evaluated in the present study but are critical markers of well-being and QoL. The adjusted R^2 values of the multivariate analyses were not particularly high, and this may indicate that there are other factors related to caregivers' QoL.

Conclusion

Despite the increasing cancer burden in Oman, there were no baseline studies on the QoL and well-being of FCGs of adult patients with cancer pain. The current study highlights that FCGs of adult patients with cancer pain have low QoL, and some of the modifiable factors that are associated with this predicament include FCGs' health status, FCGs' self-efficacy for cancer pain and symptom management, patient's functional status, and the impact of the patient's cancer pain on the caregiver. Supportive care programs and interventions can help address these factors and subsequently enhance the caregivers' QoL.

Conflicts of interest. The authors report no conflicts of interest.

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