The Role of Cognitive Appraisal in Quality of Life Over Time in Patients With Cancer

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OBJECTIVES: To better understand how personal factors, contextual factors, and cognitive appraisals predict quality of life.

SAMPLE & SETTING: 81 patients with a new diagnosis of cancer were recruited from two oncologists' offices in the midwestern United States.

METHODS & VARIABLES: A longitudinal design was used to collect data at three time points: within 1 month of diagnosis, at 6 months after diagnosis, and at 18 months after diagnosis. Data were collected using the Cognitive Appraisal of Health Scale and the Quality of Life Index–Cancer Version III.

RESULTS: Individuals identified a variety of primary appraisals at the same time and more consistently identified their cancer as a challenge rather than a harm/loss or a threat. The greatest variation in appraisals and quality of life occurred about six months after diagnosis. Hierarchical regression analyses demonstrated that age and primary and secondary appraisals explained a significant amount of variance in quality of life at all three time points.

IMPLICATIONS FOR NURSING: Interventions to improve quality of life for individuals newly diagnosed with cancer are needed and may be more helpful if they target cognitive appraisals. Nurses should assess what matters to the individual; it is important to evaluate how each person appraises a cancer diagnosis so providers can support coping and adjustment from diagnosis through individual treatment trajectories.

KEYWORDS cognitive appraisals; quality of life; longitudinal; survivorship; cancer diagnosis
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Cancer continues to be a major public health problem worldwide, and it is the second leading cause of death in the United States (American Cancer Society [ACS], 2020). In this decade, new cancer incidence rates are expected to rise because of an aging White population and a growing Black population (Centers for Disease Control and Prevention, 2018). A total of 1,806,590 new cases of cancer are projected for 2020 (ACS, 2020). Consequently, it is important to understand how individuals with a new diagnosis of cancer appraise their experience and manage the daily impact of the disease on quality of life (QOL) over time.

Living with cancer may be equated with having a chronic disease (Bryant et al., 2015; Naus et al., 2009) and is commonly associated with psychological distress (Hart & Charles, 2013). Cancer is not a singular negative event and is not considered to be solely a stressful event (Kessler, 1998). Survivors have positive and negative emotions (Hart & Charles, 2013) and adaptations to the diagnosis that are mediated by personal characteristics of survivorship (Bryant et al., 2015) and contextual characteristics of the disease (Kessler, 1998). Those who survive cancer in the longer term have a reasonable QOL (Jarrett et al., 2013) and may experience personal growth (Smith et al., 2010). Knowing that a diagnosis of cancer can be appraised based on personal and contextual factors, it is important to understand the day-to-day demands of a new chronic illness and how that illness affects QOL. It has been proposed that, over time, survivors of cancer who successfully cope with the demands of the chronic illness and its treatment may eventually appraise day-to-day stressors as less severe and bothersome for QOL (Costanzo et al., 2012).

Stress appraisals for health-related events, such as cancer, have been measured using a variety of constructs. Although some models assess singular attributions, other models focus on stress and adaptation as a process (Folkman & Greer, 2000; Lazarus

& Folkman, 1984; Naus et al., 2009). The transactional model is the most frequently referenced model related to assessing and coping with stressful situations (Newton & McIntosh, 2010). Within this model, cognitive appraisal is the process by which an individual makes a judgment about the stressfulness of the event (Lazarus & Folkman, 1984). The meaning or personal significance of a potentially stressful event (primary appraisal) and perceived resources or options for coping (secondary appraisal) influence eventual adjustment. Individuals constantly appraise their relationship to the environment and how a potentially stressful event relates to current goals and concerns (Folkman & Greer, 2000). Primary appraisals are influenced by beliefs, values, and commitments, whereas secondary appraisals are the notion of how the event can be controlled or changed (Lazarus & Folkman, 1984). Neither primary nor secondary appraisals are more important than the other, and they occur at the same time. Because appraisals are influenced by personal and environmental factors, appraisals are likely to have stable and variable aspects (Folkman & Greer, 2000). Therefore, it is important to understand how cognitive appraisals, both primary and secondary, and adjustment to cancer change over time.

During primary appraisal, a decision is made about whether the event is stressful or benign/irrelevant (belief there is no threat to well-being). If the event is stressful, the person determines if the event poses a harm/loss (previous damage or harm), a threat (potential for future harm/loss), and/or a challenge (opportunity for growth or benefit, despite the demands) (Lazarus & Folkman, 1984). Primary appraisals are expected to predict how a person copes and subsequent outcomes of the event (Hart & Charles, 2013). In a meta-analysis by Franks and Roesch (2006) examining the relationship between primary appraisal dimensions and coping strategies in people with cancer, harm/loss, threat, and challenge appraisals occurred frequently when people with cancer thought about their health condition. In survivors of advanced cancer, events identified as harm, threat, or challenge posed greater complexity for daily life (Roberts et al., 2018). Because individuals can have varying primary appraisals at the same time, measuring each appraisal concurrently allows for a more complete understanding of their impact on coping (Bigatti et al., 2012; Carpenter, 2016; Kessler, 1998) and QOL.

Although researchers have measured unidimensional aspects of cognitive appraisal (such as threat or challenge) (Chambers et al., 2012; Ellis et al., 2017; Levkovich et al., 2015; Roesch & Rowley, 2005), these constructs fail to assess all potential appraisal perceptions. Even measuring the appraisals of harm/loss, threat, and challenge as multidimensional constructs at the same time (Ahmad, 2005; Alhurani et al., 2018; Gall & Bilodeau, 2017; Hart & Charles, 2013) fails to acknowledge that some people may appraise the event as benign/irrelevant for day-to-day experiences. For example, individuals may have concurrent harm/loss, threat, challenge, and even benign/irrelevant appraisals of cancer at varying degrees over time (Kessler, 1998). Consequently, it is essential to concurrently appraise potentially stressful events, such as cancer, as harm/loss, threat, challenge, and benign/irrelevant.

According to the transactional model, personal and contextual factors affect cognitive appraisals. Personal factors include age, beliefs (preexisting notions), and commitments (Lazarus & Folkman, 1984). Older age was a predictor of better QOL in women with breast cancer (Hyphantis et al., 2013; Maly et al., 2015) and was associated with fewer harm/loss and threat appraisals and more challenge appraisals in patients receiving radiation for breast, prostate, and lung cancer (Mazanec et al., 2011). Younger age was associated with more negative appraisals four months after treatment for prostate cancer (Kershaw et al., 2008), greater risk of poorer QOL and higher prostate cancer–related distress (Chambers et al., 2017), and poorer QOL in colorectal cancer survivors (Dunn et al., 2013; Tau & Chan, 2011). Age was significantly related to lower levels of threat and greater challenge appraisals, but not to harm appraisals in individuals with colorectal cancer (Hart & Charles, 2013). Based on the evidence, age is reported as the most consistent personal factor associated with appraisals and QOL following a diagnosis of cancer, with older age having a more positive effect on appraisal and QOL.

Contextual factors are situational and are directly related to the event (Lazarus & Folkman, 1984); however, evidence is inconsistent on how these factors are related to appraisal and QOL. Factors like cancer stage and type of treatment (Maguire et al., 2017), duration of treatment (Bryant et al., 2015), and time since diagnosis (Bryant et al., 2015; Kessler, 1998; Maguire et al., 2018) have been associated with QOL. However, in a systematic review of longitudinal studies examining sociodemographic, disease-related, and psychosocial factors near diagnosis that predict later psychological adjustment to breast cancer, time since diagnosis was not related to adjustment, whereas fatigue predicted

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worse QOL in women with breast cancer (Brandão et al., 2017).

Adjustment to cancer as measured by QOL varies. Patients with lung cancer had poorer QOL compared to those with breast, colorectal, and prostate cancer (Hulbert-Williams et al., 2012). Men with prostate cancer reported the physical health dimension of QOL as highest but had poorer QOL with multiple treatments and medications (Green et al., 2011). For others with prostate cancer, threat was associated with QOL at eight months (Song et al., 2016). In a systematic review examining factors that have an impact on the QOL of patients with colorectal cancer, the diagnosis of colorectal cancer had a greater impact on QOL, with younger patients at higher risk of poorer QOL (Tau & Chan, 2011). Hulbert-Williams et al. (2012) found that QOL was moderate and increased over time, with a nonsignificant reduction between initial diagnosis and six months postdiagnosis in patients with breast, colorectal, lung, and prostate cancer. Threat and challenge appraisal were significantly associated with QOL in patients with colorectal cancer, with more challenge appraisals associated with higher QOL scores (Steginga et al., 2009).

For women with breast cancer, qualitative data suggest that the diagnosis may have a significant effect on several domains of QOL: emotional responses and challenges, fear of recurrence, beliefs about prognosis, and treatment as a physical battle (Devi & Hegney, 2011). A study by Bigatti et al. (2012) found that challenge appraisals were significantly correlated with the coping strategies of women with advanced-stage breast cancer; harm/loss appraisals were related to depressive symptoms; and benign/irrelevant appraisals were endorsed the least. At diagnosis and during treatment, women with breast cancer tend to report psychological distress and lower levels of QOL (Stafford et al., 2013). Evidence from the literature demonstrates that a cancer diagnosis rarely has a completely negative or positive impact on QOL and that appraisals, cancer type, and time since diagnosis may have differing associations with QOL.

Realizing that it is important to determine how an individual appraises the day-to-day demands of a new chronic illness, such as cancer, the purpose of this study was to better understand how personal factors, contextual factors, and cognitive appraisals predict QOL. Specific hypotheses were that (a) individuals would identify a variety of primary appraisals at the same time; (b) challenge would be the predominant primary appraisal of the cancer diagnosis; (c) personal and contextual factors would affect QOL over time; and (d) primary and secondary appraisals would predict QOL over time.

Methods

Sample and Setting

A longitudinal design was used, and data were collected at three time points: at diagnosis, at 6 months postdiagnosis, and at 18 months postdiagnosis. Eligible participants were aged 18 years or older, had received a new cancer diagnosis, were patients at two oncologists' offices in a rural/suburban community in the midwestern United States, and were able to read and understand English. Patients were excluded if they had a previous cancer diagnosis and if the diagnosis occurred more than one month ago. Patients with a variety of cancer diagnoses were recruited to expand the pool of potential patients who met all inclusion and exclusion criteria. Following institutional review board approval, one oncologist at each office identified and recruited eligible patients (N = 164) during a three-month recruitment period. A detailed explanation of the study was provided. The goal was to enroll at least 100 participants; however, only 81 individuals agreed to participate at the end of the recruitment period.

Instruments

Personal and contextual factors: Based on the transactional model (Lazarus & Folkman, 1984), personal (age, race, education, marital status) and contextual characteristics (type of cancer, time since diagnosis, type of treatment, treatment symptoms, and cancer symptoms) were collected. The current author developed an instrument with 16 self-report open- and closed-ended questions that were used to measure these personal and contextual factors. The instrument was reviewed by two advanced practice nurses with expertise in oncology to support content validity; it was piloted prior to data collection.

Cognitive appraisal: The Cognitive Appraisal of Health Scale (CAHS) was developed as a self-report measure of the multidimensional concept of cognitive appraisal based on the transactional model (Kessler, 1998). Although a shortened version of the CAHS has been tested (Ahmad, 2005; Alhurani et al., 2018; Hamama-Raz et al., 2007; Umstead et al., 2018), it fails to appraise the event as potentially benign/irrelevant. According to Lazarus and Folkman (1984), not all events assumed to be stressful are appraised as stressful, and multiple appraisals may be appraised simultaneously. The CAHS has 28 items measured on a five-point Likert-type scale ranging from 1 (strongly

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disagree) to 5 (strongly agree). In the current study, the Cronbach alpha for harm/loss ranged from 0.9 to 0.95 (eight items), from 0.64 to 0.75 for threat (five items), from 0.73 to 0.84 for challenge (six items), and from 0.67 to 0.7 for benign/irrelevant (four items). Five independent items measure the secondary appraisals of "can change or do something," "hold self back," "nothing need to do," "know more," and "have to accept" on the same five-point Likert-type scale. In a review of instruments measuring cognitive appraisals, the CAHS was evaluated as the most theoretically complete instrument derived from the transactional model (Carpenter, 2016).

Quality of life: QOL outcomes were measured using the multidimensional 66-item Quality of Life Index–Cancer Version III (QLI-CV) (Ferrans, 1990). This instrument was chosen because it measures multiple factors affecting QOL in individuals experiencing cancer and fits with the transactional model. Factors include physical day-to-day functioning, psychological moods and beliefs, social role functioning, and financial impact. The instrument assesses not only how satisfied the person is with the factor but also how important the factor is to his or her QOL; not all individuals may judge a factor as being important to overall QOL. On the QLI-CV, 33 items measure satisfaction with aspects of one's life on a six-point Likert-type scale ranging from 1 (very dissatisfied) to 6 (very satisfied), and 33 items measure the importance of those aspects on a six-point Likert-type scale ranging from 1 (very unimportant) to 6 (very important). QOL scores are computed by weighting each

TABLE 1. Sample Characteristics by Time Point: Demographics and Cancer Type and Timing

	Time 1 (N = 81)		Time 2 (N = 65)		Time 3 (N = 48)			
Characteristic	**$\bar{X}$**	**SD**	**$\bar{X}$**	**SD**	**$\bar{X}$**	**SD**	**F**	**p**
Age (years)	61.78	13.49	61.45	13.41	63.71	10.19	0.043	0.958
Education (years)	13.81	2.94	13.85	2.94	13.86	2.74	0.002	0.998
Time since diagnosis	14.87[a]	9.86	7.85[b]	3.1	18.93[b]	3.11	1.69	0.201
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**	**χ^2**	**p**
Cancer type							3.769	0.957
Breast	33	41	30	46	30	63		
Colon	9	11	9	14	7	15		
Lung	12	15	8	12	5	10		
Melanoma	6	7	3	5	3	6		
Ovarian	6	7	3	5	–	–		
Other	15	19	12	18	3	6		
Gender							1.13	0.568
Female	60	74	46	71	39	81		
Male	21	26	19	29	9	19		
Marital status							0.637	0.996
Single	6	7	6	9	3	6		
Married	60	74	48	74	36	75		
Divorced	3	4	–	–	–	–		
Widowed	12	15	11	17	9	19		
Race							0.248	0.883
White	75	93	63	97	47	98		
Black	3	4	1	2	–	–		
Hispanic	3	4	1	2	1	2		

[a] Measured in days
[b] Measured in months
Note. Time 1 was within 1 month of diagnosis, time 2 was within 6 months of diagnosis, and time 3 was within 18 months of diagnosis.
Note. Because of rounding, percentages may not total 100.

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satisfaction score with the corresponding importance score. Total scores range from 0 to 30, with higher scores indicating better QOL. In previous studies, the Cronbach alpha has ranged from 0.73 to 0.99 (Ferrans & Powers, n.d.). In the current study, the Cronbach alpha ranged from 0.82 to 0.92.

Procedures

After completing informed consent, those agreeing to participate completed the study instruments (personal and contextual factors, CAHS, and QLI-CV) in person at the oncology office within one month of diagnosis (time 1). About 6 months (time 2) and 18 months (time 3) after diagnosis, participants were mailed another letter of informed consent, the same instruments, and a self-addressed return envelope. If completed instruments were not returned within two weeks, a follow-up packet was sent. At time 2 and time 3, 65 participants (80%) and 48 participants (59%), respectively, provided complete data. These response rates over time were similar to research involving individuals newly diagnosed with cancer (Hart & Charles, 2013). All statistical analyses were computed with IBM SPSS Statistics, version 22.0.

Results

Sample Characteristics

At time 1, descriptive statistics were calculated (see Tables 1 and 2). The majority of participants were female, White, married, and no longer working full-time, and they had at least a high school education. At times 2 and 3, personal and contextual characteristics were not statistically different ($p > 0.05$). The top cancer diagnoses were breast, lung, colon, and other. Almost half of the participants (n = 33) received chemotherapy as their initial treatment, followed by hormones, surgery, and radiation. At times 2 and 3, fewer participants were receiving treatment, but the percentages of each type of treatment remained consistent ($\chi^2 = 3.719$, $p = 0.843$). Fatigue/tiredness was the most common side effect attributed to treatment at time 1, whereas nausea was most common at time 2, and hair loss and pain were most common at time 3. Participants also reported effects of the cancer;

TABLE 2. Sample Characteristics by Time Point: Treatment and Symptoms

	Time 1		Time 2		Time 3			
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**	χ^2	**p**
Cancer symptom							0.23	0.994
Pain	24	57	6	20	9	30		
Fatigue/tiredness	12	29	6	20	12	40		
Nausea	3	7	18	60	–	–		
Depression	–	–	–	–	3	10		
Edema	–	–	–	–	3	10		
Other	3	7	–	–	3	10		
Current treatment							3.719	0.843
Chemotherapy	33	53	12	33	3	17		
Radiation therapy	12	19	6	17	–	–		
Surgery	12	19	3	8	–	–		
Hormone therapy	6	10	15	42	15	83		
Treatment symptom							0.623	0.843
Fatigue/tiredness	18	46	6	20	–	–		
Hair loss	9	23	–	–	6	40		
Nausea	6	15	21	70	–	–		
Pain	–	–	–	–	6	40		
Other	6	15	3	10	3	20		

Note. Time 1 was within 1 month of diagnosis, time 2 was within 6 months of diagnosis, and time 3 was within 18 months of diagnosis.
Note. For cancer symptoms, N was 42 at time 1, 30 at time 2, and 30 at time 3. For current treatment, N was 63 at time 1, 36 at time 2, and 18 at time 3. For treatment symptoms, N was 39 at time 1, 30 at time 2, and 15 at time 3.
Note. Because of rounding, percentages may not total 100.

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TABLE 3. Primary and Secondary Appraisals and Quality of Life by Time Point

	Time 1 (N = 81)		Time 2 (N = 65)		Time 3 (N = 48)		
Item	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	F
Threat	16.63	7.8	13.71	4.42	14.13	4.73	6.638**
Harm/loss	20.56	8.74	19.67	9.74	19.53	8.4	6.388*
Challenge	22.63	3.86	22.76	4.94	23.6	3.18	0.078
Benign/irrelevant	9.7	3.77	10.62	3.57	10.4	3.76	5.891*
Can change or do something	3.55	1.11	3.55	1.08	3.67	1.09	0.684
Hold self back	2.63	1.29	2.62	1.18	2.31	1.4	0.554
Nothing need to do	1.85	1.01	1.81	0.8	2.46	1.23	20.163**
Know more	2.78	1.26	2.65	1.2	2.77	0.9	0.698
Have to accept	4.26	0.8	4	0.98	4.15	0.87	3.192
Quality of life	21.92	5.63	23.02	4.52	21.67	6.76	1.814

* $p < 0.01$; ** $p < 0.001$
Note. Time 1 was within 1 month of diagnosis, time 2 was within 6 months of diagnosis, and time 3 was within 18 months of diagnosis.
Note. The 28-item Cognitive Appraisal of Health Scale was used to evaluate primary and secondary appraisals. All items were measured on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Total possible scores for the primary appraisals of threat (5 items), harm/loss (8 items), challenge (6 items), and benign/irrelevant (4 items) were 25, 40, 30, and 20, respectively. The total possible score for each of the secondary appraisals of "can change or do something," "hold self back," "nothing need to do," "know more," and "have to accept" was 5. Quality of life was measured using the 66-item Quality of Life Index–Cancer Version III; 33 items measure satisfaction with aspects of one's life on a scale ranging from 1 (very dissatisfied) to 6 (very satisfied), and 33 items measure the importance of those aspects on a scale ranging from 1 (very unimportant) to 6 (very important). The total score ranges from 0 to 30, with higher scores indicating better quality of life.

fatigue/tiredness and pain were identified at all three time points.

Appraisal and Quality of Life

Descriptive statistics for primary and secondary appraisals are available in Table 3. Participants experienced all primary appraisals, including benign/irrelevant, at each time point as hypothesized. Harm/loss, threat, and benign/irrelevant appraisals changed significantly over time ($p < 0.05$), whereas challenge appraisals did not ($p > 0.05$). The greatest variation in primary appraisals occurred at time 2, with threat appraisals at their lowest and challenge and benign/irrelevant appraisals at their highest. Harm/loss appraisals declined at time 2 and continued to decline at time 3. Challenge appraisals were predominant at each time point as hypothesized; they increased from time 1 to time 3, although not significantly, and were at their highest at time 3. For secondary appraisals, participants agreed they could "change or do something" and "have to accept" what was happening with their cancer diagnosis at each time point. Participants disagreed that there was "nothing need to do" about the diagnosis at times 1 and 2; however, this secondary appraisal increased significantly at time 3. Remaining secondary appraisals were not significantly different over time ($p > 0.05$). QOL did not change significantly over time ($p > 0.05$) and was the highest at time 2.

Key personal and contextual variables, cognitive appraisals, and QOL were significantly associated (see Table 4). Among the continuous variables, age was associated with higher levels of QOL, time since diagnosis, benign/irrelevant appraisals, and secondary appraisals of "can change or do something" and need to "know more." Age was negatively associated with "nothing need to do." Education was not associated with appraisals or QOL. Time since diagnosis was only associated with the secondary appraisal of "hold self back." Primary and secondary appraisals were associated with QOL. Threat and harm/loss were negatively associated with QOL, whereas challenge and benign/irrelevant appraisals were positively associated. Challenge was positively associated with "can change or do something" and inversely associated with "hold self back" and "nothing need to do." Harm/loss

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was positively associated with "hold self back" and "nothing need to do," whereas threat was negatively associated with "can change or do something." Threat was also strongly associated with "have to accept." The need to "know more" was only weakly associated with threat. All secondary appraisals, except for the need to "know more" were significantly associated with QOL. The dichotomous variables of current treatment and symptoms were not associated with primary or secondary appraisals or QOL ($p > 0.05$).

Multivariate Analysis

Hierarchical regression analyses were conducted to assess hypotheses derived from the model and associations for explaining variances in QOL (see Table 5), including whether personal and contextual factors along with primary and secondary appraisals would predict QOL. In a hierarchical approach, variable selection uses an a priori approach in which explanatory variables are entered in blocks specified by the researcher according to the model. In the current study, the personal characteristic of age was entered first because it was the only personal or contextual factor significantly correlated with appraisals and QOL. Age explained 7% of the variance at time 1, 1% at time 2, and 11% at time 3. During the second stage, primary appraisals of harm/loss, threat, challenge, and benign/irrelevant were entered to determine the remaining variance in the outcome variable of QOL after controlling for the variable of age that had been previously added. These additions in the second step increased the explained variance by 75% at time 1, 57% at time 2, and 71% at time 3. For the third stage, secondary appraisals were entered, except for the need to "know more" because this item was not significantly correlated with QOL. For the full model, nine independent variables—age; primary appraisals of harm/loss, threat, challenge, and benign/irrelevant; and secondary appraisals of "can change or do something," "hold self back," "nothing need to do," and "have to accept"—explained the variance in QOL scores at time 1 ($R^2 = 84$, $F[9, 68] = 39.65$, $p < 0.001$); at time 2 ($R^2 = 72$, $F[9, 38] = 10.73$, $p < 0.001$); and at time 3 ($R^2 = 87$, $F[9, 32] = 24.05$, $p < 0.001$).

Discussion

Findings provide theoretical support for the transactional model, with age (as a personal factor) and

TABLE 4. Correlations Among Study Variables at Time 1

Var	Age	Ed	Time	Threat	H/L	Chal	B/I	Chg	Hold	Need	Know	Acc	QOL
Age	1	–0.02	0.46[a]	–0.1	–0.06	0.14	0.22[b]	0.44[a]	–0.15	–0.23[b]	0.48[a]	–0.23[b]	0.27[b]
Ed	–	1	0.11	0.02	0.08	0.13	–0.02	0.14	–0.11	–0.04	0.01	–0.03	–0.04
Time	–	–	1	0.07	0.21	0.07	0.14	0.16	0.27[b]	–0.08	0.15	0.11	0.04
Threat	–	–	–	1	0.4[a]	–0.27[b]	0.25[b]	–0.23[b]	0.19	0.12	0.25[b]	0.83[a]	–0.34[a]
H/L	–	–	–	–	1	–0.57[a]	–0.49[a]	–0.34[a]	0.83[a]	0.33[a]	0.11	0.19	–0.8[a]
Chal	–	–	–	–	–	1	0.37[a]	0.67[a]	–0.43[a]	–0.39[a]	0.06	–0.2	0.8[a]
B/I	–	–	–	–	–	–	1	0.12	–0.18	0.05	–0.21	–0.15	0.45[a]
Chg	–	–	–	–	–	–	–	1	–0.33[a]	–0.46[a]	0.2	–0.25[b]	0.58[a]
Hold	–	–	–	–	–	–	–	–	1	–0.43[a]	–0.18	–0.33[a]	–0.6[a]
Need	–	–	–	–	–	–	–	–	–	1	–0.14	0.19	–0.39[a]
Know	–	–	–	–	–	–	–	–	–	–	1	–0.02	–0.03
Acc	–	–	–	–	–	–	–	–	–	–	–	1	–0.31[a]
QOL	–	–	–	–	–	–	–	–	–	–	–	–	1

[a] $p < 0.01$
[b] $p < 0.05$
acc—have to accept; B/I—benign/irrelevant; chal—challenge; chg—can change or do something; ed—education; H/L—harm/loss; hold—hold self back; know—know more; need—nothing need to do; QOL—quality of life; time—time since diagnosis; var—variable

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cognitive appraisals demonstrating strong predictive relationships with QOL. As hypothesized, individuals identified a variety of primary appraisals at the same time and challenged appraisals that were predominant and demonstrated the strongest positive relationship with QOL. Challenge appraisals are the opportunity for growth or benefit despite the demands of the cancer diagnosis (Lazarus & Folkman, 1984). Individuals appraised the cancer diagnosis as having aspects of being benign/irrelevant to daily life at each time point. This finding was consistent with research demonstrating that individuals may appraise the cancer diagnosis concurrently with aspects of threat, harm/loss, challenge, and even benign/irrelevant appraisals (Kessler, 1998).

Different predictor appraisals may be more important over time, and outcomes, such as QOL, may vary over time. Similar to other research, challenge appraisals in the current study significantly predicted higher QOL, whereas threat appraisals significantly predicted lower QOL (Umstead et al., 2018). Threat appraisals were highest at time 1, or within one month of diagnosis, when the future is unknown and the person does not know how treatment and the diagnosis may affect day-to-day functioning and future life. Surprisingly, threat appraisals decreased at time 2, or about six months after diagnosis. It is possible that the participants anticipated a more severe treatment trajectory after initial diagnosis but learned they were able to cope with treatment and maintain a better QOL than expected. Then, at time 3, or about 18 months after diagnosis, threat appraisals increased and QOL decreased. The more that individuals perceive the cancer diagnosis as threatening, the more likely it is that their QOL decreases (La & Yun, 2017), and this negative association was found in the current study. Eighteen months after their cancer diagnosis, individuals may begin to look at the future chronicity of the disease and the continued daily demands that affect QOL.

In this sample, harm/loss demonstrated a negative relationship with QOL soon after diagnosis. During harm/loss appraisals, the person considers previous damage or harm that has occurred (Lazarus & Folkman, 1984). Findings demonstrated that the cancer diagnosis was perceived as a harm/loss but that future threat would be less negative for QOL. Although little research has examined the impact of secondary appraisals, secondary appraisals added to the explained variance in QOL outcomes as hypothesized. "Hold self back" and "can change or do something" were most strongly correlated with QOL, reflecting that cancer diagnosis and treatment hold potential harm and a negative impact on day-to-day functioning, but also an opportunity to control some of what is happening, despite the demands.

At times 1 and 3, "hold self back" and "have to accept" each significantly explained the variance in QOL. The secondary appraisal of "have to accept" may reflect the uncertainty of the new diagnosis at time 1 and the acceptance of the chronicity of the disease at time 3. Because time 3 had the highest challenge and benign/irrelevant appraisals for day-to-day functioning and was when QOL was highest, it was not surprising that the participants perceived that there was less need to "know more" about what they needed to do to manage the diagnosis.

The strongest personal or contextual characteristic that predicted QOL was age; however, its impact varied. At times 1 and 3, increased age was positively predictive, and at time 2, age was not significantly predictive and was negative. Kershaw et al. (2008) found similar results; younger age was associated with more negative appraisals four months after treatment for prostate cancer. Younger age was also a risk factor for poorer QOL among patients with colorectal cancer (Dunn et al., 2013); this was likely because of the life stage demands and expectations of younger adults.

At time 3 in the current study, age was a positive predictor. In other studies, older adults with non-Hodgkin lymphoma had better QOL than younger survivors (Bryant et al., 2015; Smith et al., 2010). Older adults may have more experience with coping with stressful events and have fewer family and other demands affecting perceived QOL. Although age had negative loadings during regression analysis at time 2 in the current study, age had little predictive value. It is possible that at time 2, participants were focused on the demands of treatment and what the diagnosis might mean for their future. As seen in the regression model, other predictors may better explain the variance in QOL six months after diagnosis. Although research has supported the impact of contextual factors on QOL (Bryant et al. 2015; Maguire et al., 2018), results from the current study did not support the hypothesis that contextual factors, such as type of cancer, time since diagnosis, and type of treatment, would affect QOL. This finding may be attributable to the small sample size and the greater variability in contextual factors in this sample.

Although it may be expedient to classify stressful events as a primary appraisal of threat, challenge, or harm/loss, the overall impact of day-to-day living has greater complexity (Roberts et al., 2018). This may be

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particularly true when managing daily side effects of treatment and the cancer experience, such as fatigue. As in other studies (James et al., 2015; Lo-Fo-Wong et al., 2016; Niklasson et al., 2017), fatigue was the most common symptom in the current study, regardless of cancer type. In fact, cancer-related fatigue has been identified as the most common side effect of the cancer experience (Corbett et al., 2016; Palesh et al., 2018). Fatigue is often described as an overwhelming, persistent feeling of physical, emotional, and/or cognitive tiredness (Berger et al., 2015) that is unpredictable (James et al., 2015).

In contrast to other literature, symptoms in the current study were not significantly related to appraisals or to QOL; therefore, they were not entered into this study's regression analyses. Although participants often reported fatigue related to the diagnosis, they also reported stronger challenge appraisals. According to Levkovich et al. (2015), challenge appraisals may provide a protective factor against psychological symptoms of fatigue by offering the opportunity to discover other forms of relaxation, such as meditation, that may be enjoyed as a way to deal with treatment side effects. Because challenge appraisals were predominant at all three time points in the current study, these appraisals may have weakened the strength of the relationship with QOL. Fatigue is a significant symptom, and effective support, as well as information to understand and adopt coping strategies, is still needed to improve QOL (James et al., 2015). Interventions should include self-management and cognitive behavioral strategies provided during

TABLE 5. Regression Analyses for Study Variables (Beta Coefficients)

Variable	Time 1	Time 2	Time 3
Model 1			
Age	0.114*	0.022	0.304*
Model 2			
Age	0.047*	–0.015	0.475***
Threat	–0.005	–0.301**	–1.58***
Harm/loss	–0.309***	–0.242	–0.31*
Challenge	0.722***	–0.002	–0.38
Benign/irrelevant	–0.008	0.025	–1.641***
Model 3			
Age	0.026	–0.031	0.416***
Threat	0.036	–0.721*	–1.684***
Harm/loss	–0.471***	–0.406***	–0.561***
Challenge	0.616***	–0.503**	–0.244
Benign/irrelevant	–0.101	–0.428	–1.715***
Can change or do something	0.39	0.688	–0.782
Hold myself back	1.001*	0.366	1.278*
Nothing need to do	0.097	1.995*	–0.043
Have to accept	–0.93*	–1.087	2.351**
R^2			
Overall	0.84	0.72	0.871
Adjusted R^2			
Overall	0.819	0.651	0.835
F statistic			
Overall	39.649	10.734	24.05

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
Note. The p value for all 3 time points was $p < 0.001$.
Note. Time 1 was within 1 month of diagnosis, time 2 was within 6 months of diagnosis, and time 3 was within 18 months of diagnosis.

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treatment and in community settings (Steginga et al., 2009) over time as the cancer trajectory changes.

In the current study, QOL improved at time 2, a time when the number of participants who were currently receiving treatment decreased, but QOL fell to its lowest level at time 3. This pattern of change was similar to that observed in a study of survivors of prostate cancer by Maguire et al. (2018); QOL was higher at one year postdiagnosis but decreased between two and five years after diagnosis. Maguire et al. (2018) posited that this decrease could be attributed to aging and the development of comorbidities but also to the realization that survivors' level of functioning may not recover. As the cancer diagnosis and its treatment become more distant and other health conditions arise with normal aging, other factors may explain changes to QOL. It is possible that individuals may begin to realize over time the chronic nature of the diagnosis and its continued impact on QOL. In contrast to findings from the current study, Hulbert-Williams et al. (2012) found that QOL was moderate and increased over time, with a nonsignificant reduction between initial diagnosis and sixth months postdiagnosis in patients with breast, colorectal, lung, and prostate cancer. Hulbert-Williams et al. (2012) proposed that different predictors of QOL may be more important for QOL at different points in time, which would account for the reduction in QOL at six months postdiagnosis.

As the demands of cancer treatment decreased in the current study, appraisal and QOL changed. This finding was similar to that from a study by Hart and Charles (2013), where the demands of treatment were largely completed at six months after diagnosis and the participants perceived greater well-being, lower threat appraisals, and greater challenge appraisals. Perceiving the cancer diagnosis as less threatening may help to attenuate the negative aspects, compared to reframing the event as a challenge (Hart & Charles, 2013). If it is possible to appraise cancer as less of a threat and more of a challenge, a person can learn to master the situation or replace maladaptive coping strategies with more adaptive coping strategies to regain or restore well-being (Lazarus & Folkman, 1984). Chambers et al. (2012) supported the need to assess appraisals to target future psychosocial interventions. In the current study, threat appraisals were strongest at time 1 but challenge appraisals were even greater, suggesting that the participants were concerned about future threats of the diagnosis but appraised the potential for growth or benefit despite the demands.

KNOWLEDGE TRANSLATION

- Assessment of cognitive appraisals, in the primary and secondary dimensions, provides a foundation to help individuals cope with the chronic illness of cancer.
- Appraisals at one point in time cannot be expected to influence future appraisals, which necessitates reassessment of what is currently happening to improve quality of life.
- Interventions should be designed to target cognitive appraisals in which individuals can learn to master adaptive coping strategies to retain or improve quality of life.

Limitations

The small sample size for the regression models and the variability in characteristics of the participants limit generalizability and the ability to determine true causal models. However, data were collected longitudinally to better link appraisal factors with QOL, and other researchers have identified the need to look at the adaptation model over time (Bryant et al., 2015). To strengthen the regression models, predictive variables were entered only if they were significantly related to QOL. With a larger sample, predicted relationships based on theory, such as the impact of contextual factors, may be better tested. The sample in the current study was predominantly White and included small numbers of several cancer diagnoses. Although characteristics of the sample matched the community from which the sample was drawn, additional research with a more diverse and larger sample is needed to better reflect the U.S. population and add power to the design of the study.

Recruiting potential participants so close to a cancer diagnosis is unusual and may account for the lower response rate to the initial invitation to participate. However, the retention rate over time demonstrated that the characteristics of the sample stayed consistent, and retention rates were similar to those noted by other researchers who collected data during similar times after diagnosis (Hart & Charles, 2013). Some reasons for attrition were known and were related to the severity of the cancer diagnosis, with several of the participants dying during the study period. In future research, collecting data about anticipated treatment conclusion and disease stage may provide insight into how these contextual factors may affect appraisal and QOL, as well as longitudinal retention rates. The current study does have strength in its longitudinal design; it followed individuals during a time when treatment

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and recovery are more prominent and have a potentially stronger impact on appraisal and adjustment. Fatigue was the most commonly reported side effect of treatment and diagnosis and can have a day-to-day effect on QOL.

Implications for Nursing

Interventions to support and improve QOL are needed at diagnosis and throughout the treatment trajectory, and they may be more helpful if they target cognitive appraisals. Nurses should incorporate assessment of cognitive appraisal (primary and secondary dimensions) initially and throughout treatment for cancer to guide interventions that support QOL. In practice, it is important to create opportunities for individuals to view their cancer diagnosis as a potential challenge; this promotes and maintains well-being (Folkman & Greer, 2000). Because each person brings unique personal and contextual factors to the diagnosis and treatment trajectory, nurses should assess what matters to the individual at each encounter to support the opportunity for challenge appraisals (Folkman & Greer, 2000). Cognitive behavioral approaches can further support challenge appraisals and are effective in improving QOL (Chambers et al., 2011). Nurses should ask the patient to recount positive events between visits to focus on the opportunity for growth despite the demands of the illness. To diminish threat and harm/loss appraisals, nurses should encourage access to services, such as counseling and support groups, to reduce these negative perceptions. A threat appraisal may be converted to more of a challenge appraisal by looking at alternatives that are made possible because of the cancer. Interventions for patients who appraise increased harm/loss and threat appraisals can be designed to help patients objectively evaluate their cancer and options for treatment to perceive the situation as less threatening. Nurses and family members can provide tangible and emotional support and encourage adaptive coping behaviors, such as obtaining additional information about successful examples of fighting cancer and regaining a sense of normalcy during and after treatment.

By knowing how a person perceives resources or options for coping, nurses may be able to deliver interventions that fit more closely with a secondary appraisal. For example, individuals may perceive the need to hold themselves back from doing what they want because of the demands of cancer and its treatment. Any assessment of the cancer experience and support provided to those with cancer must consider changing appraisals. As time from diagnosis continues, other variables may have a greater impact on QOL. Helping patients construct a more positive appraisal, despite the challenges, may help them maintain higher levels of QOL.

Individuals make reappraisals to reflect new events, such as side effects and changing physical abilities. Nurses must recognize that appraisals at one time point cannot be expected to influence future appraisals. Assessing what is happening currently regarding cognitive appraisal is important to understand current QOL. Patients with cancer should have early and regular screening for cognitive appraisals and QOL. Early and repeated assessments may lead to more targeted supportive care interventions (Chambers et al., 2017).

Conclusion

Understanding the cancer experience trajectory enhances the healthcare community's ability to support those in treatment and assists with continued assessment of the patient's day-to-day perceptions of the disease and its impact on QOL. In the current study, cognitive appraisals, in the primary and secondary dimensions, explained a significant amount of variance in QOL scores soon after and as many as 18 months after a new diagnosis of cancer. Helping providers understand how individuals cognitively appraise the diagnosis provides a foundation to help individuals cope with the chronic condition.

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