Nothing left to chance? The impact of Locus of Control on physical and mental quality of life in terminal cancer patients

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Abstract

Purpose—To evaluate if Locus of Control (LOC) predicts various quality of life (QOL) and mental well-being measures among terminally ill cancer patients at the time of palliative care consult.

Methods—Multi-site analysis of patients with advanced cancer being seen as new patients in a Palliative and Supportive Care outpatient clinic. Patients completed the following surveys: Locus of Control Scale (LOC), Functional Assessment of Chronic Illness Therapy-General (FACT-G), Functional Assessment of Chronic Illness Therapy–Spiritual (FACIT-Sp), Hospital Anxiety Depression Scale (HADS), and Herth Hope Index (HHI).

Regression models were created to examine the effect of LOC upon QOL, symptoms, and other measures of mental well-being. These models adjusted for the effect of age, gender, race, partnership status, education, and months since diagnosis as potential confounders.

Results—This study enrolled 100 patients. After adjusting for site, race and partnership status, higher levels of LOC Chance predicted decreased QOL (FACT-G) (p< 0.01). Higher levels of LOC Chance also correlated with increased depression and anxiety (p 0.01) and decreased meaning/peace and faith (p 0.01). Additionally, higher levels of LOC Chance predicted decreased hope (HHI) (p 0.001).

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Conclusions—Terminally ill cancer patients with a high LOC chance may be at risk for decreased physical and mental well-being at the end of life. Efforts should be made to identify these patients and design interventions to increase their feeling of control over the situation in order to improve physical and mental well-being at the end of life.

Keywords

Cancer; locus of control; quality of life

INTRODUCTION

Patients with advanced cancer near the end of life must find a way to cope with their illness and provide a context for the dying process. During this process, patients may identify various entities as controlling their day to day lives. Some individuals function with a high sense of internal control and may focus on the tangible aspects of their life that they can have power over. Others relinquish control of their fate and leave matters to a "powerful other" or chance. The individual's perception of control regarding life circumstances can impact his or her physical quality of life (QOL) and overall mental well-being (1–4).

Rotter's Locus of Control (LOC) theory describes the way in which individuals comprehend the influences impacting their lives (5). LOC can be described as having two main influencing factors: internal control and external control. The internal control factor represents an individual's opinion/sense that his/her outcomes are determined by his/her own actions (5). The external control factor represents an individual's opinion/sense that his/her outcomes are determined by outside influences (i.e. chance or powerful others) (5). Rotter describes the chance subcategory as representing "luck," "fate," or a random occurrence that controls experiences. The powerful others subcategory represents "others" in a position of power (i.e. a leader, a medical provider, or a deity) that the patient perceives as controlling his life (5). The LOC is a continuum of perceived control because most individuals do not view their destiny as exclusively being dictated by internal or external control.

High internal LOC has been associated with improved health habits, participation in screening tests, and improved mental well-being after a disease diagnosis (6–10). The influence of external LOC on physical and mental well-being is not well understood. Some studies suggest that high external LOC may be associated with decreased quality of life and mental well-being while others demonstrate improved outcomes (3, 11–13) . Prior research in cancer patients suggest that a high external LOC may be related to increased rates of depression (14). The primary objective of our study was to evaluate the manner in which LOC impacts QOL and mental well-being of patients with advanced stage cancer who had been referred to a cancer center's supportive care clinic. We hoped to identify possible targets for interventions that may improve the QOL experienced at the end of life among patients with advanced cancer.

METHODS

Study Design

One-hundred consecutive patients with advanced cancer who presented as new patients for outpatient evaluation and treatment in the Department of Supportive Care at The University of Texas MD Anderson Cancer Center in Houston, Texas were recruited to complete five standardized measures outlined below. These standardized measures were selected in order to allow the investigators to examine the relationship between LOC, physical QOL, and mental QOL. Inclusion criteria required an advanced cancer diagnosis and an expected life expectancy greater than 6 weeks. Exclusion criteria included inability to speak or read English, chemotherapy within the past 2 weeks prior to survey administration, and known brain metastases.

This study was approved by the Institutional Review Board (IRB). Informed consent was obtained and research assistants administered surveys relating to aspects of QOL and psychosocial issues during their regularly scheduled visits. Medical records were reviewed to collect patient demographics and disease demographics.

Measures

Locus of Control Scale (LOC)—This 9- item, validated, self-administered questionnaire is a modification of the original 24-item scale by Levenson that is based on Rotter's LOC theory. The questionnaire measures the extent to which people believe that their situations are determined by internal or external control (5, 15, 16). The survey uses a 7-point Likert scale ranging from "strongly agree" to "strongly disagree." The scale has three subscales: internal, chance, or powerful others. The internal subscale represents perceived internal control. The chance and powerful others subscale represents perceived external control. A higher score in a given subscale suggests increased perception that the factor is controlling the individual's life situation. For example a higher internal LOC score indicates that a person perceives themselves (internal control) to be guiding life events instead of chance events or powerful others (external control).

Functional Assessment of Chronic Illness Therapy—Spiritual Well-Being Scale (FACIT-Sp)—The FACIT-Sp is a 12- item, validated, self-administered questionnaire that evaluates spiritual well-being. The survey uses a five-point Likert scale (0 meaning "not at all" to 4 meaning "very much") (17). The FACIT-Sp has two subscales: Meaning/Peace (M/P) and Faith (17). M/P evaluates the meaning, peace, and purpose in the individual's life (17). Faith assesses the interaction between illness and the individual's personal faith or spiritual beliefs (17). M/P scores range from 0 to 32; Faith scores range from 0 to 16. Higher scores indicate a higher level of either M/P or Faith (18). Adding the two subscales together provides a total score for spiritual well-being (SWB), with a higher total score indicating a higher level of SWB (18).

Functional Assessment of Chronic Illness Therapy-General (FACT-G)—The FACT-G is a 27- item, validated, self- administered questionnaire that assesses four domains of QOL cancer patients: physical well-being, functional well-being, social/family well-

being, and emotional well-being (19). The FACT-G uses a Likert-scale (0 to 4). The sum of the subscale scores indicates the total QOL score; higher scores indicate higher QOL (19).

Herth Hope Index (HHI)—The HHI is a 12- item, validated, self-administered questionnaire that measures the cognitive, affective, behavioral, temporal, and contextual dimensions of hope (20). Participants respond to items on a 4-point Likert scale. The scale has three subscales: Inner Sense of Temporality and Future, Inner Positive Readiness and Innerconnectedness with Self and Others. These scales are added together to obtain the total HHI. A higher score indicates a higher level of hope (20).

Hospital Anxiety and Depression Scale (HADS)—The HADS is a fourteen-item, validated, self- administered scale that detects states of depression and anxiety in an outpatient setting (21). The scale is composed of two subscales: Depression and Anxiety. Respondents answer questions using a scale of 0 to 3 (21). A higher score on each subscale indicates increased anxiety or depression, respectively (21).

Analysis Plan

Descriptive statistics were calculated to summarize the study population demographics. Potential differences in faith, meaning/peace, spirituality, quality of life, depression, anxiety, symptom burden, and hope were examined using t-tests, one-way ANOVA models and Pearson correlations. Statistical significance for these analyses was set at $p < 0.01$ to limit the familywise Type I error rate to 0.07 for each scale analysis. Linear regression models were then created to determine whether LOC (independent variable) was associated with the other scales described above (dependent variables). LOC chance, LOC powerful others and LOC internal control were examined individually in separate models. These models also included terms for age, gender, race, marital status, education, and time since diagnosis as potential confounders. Time since diagnosis was log-transformed prior to inclusion in the model because model fit was better with the transformed values than with the raw values according to the plot of residuals by months since diagnosis. Statistical significance was limited to $p < 0.01$ in these models, which limited the familywise Type I error rate to $1 - [(1-0.01)^{30}] = 0.26$ (10 terms per model x 3 models per outcome – one with LOC chance, another with LOC powerful others and a third with LOC internal control.

RESULTS

Descriptive Statistics

A total of 100 patients were enrolled in this study (Table 1). Forty-eight percent were male and 52% were female. The majority of the patients were white, married, Christian, and had at least some college education. The median number of months since diagnosis was 0.83 months. The median time from study enrollment until time of last follow-up or date of death was 2.88 months. Demographic characteristics were not associated with LOC Chance, LOC Powerful Others, or LOC Internal Control scores.

LOC Chance as a Potential Predictor for scores on FACIT-Sp, FACT-G, HHI, HADS

Patients with high LOC chance scores had lower FACIT-Sp Meaning/Peace (p<0.001) and Faith scores (p<0.01). Those with high LOC chance scores also had lower FACT-G total scores (p<0.01). Patients with higher LOC chance scores had lower FACT-G Functional Well Being scores (p<0.01). There was no significant difference seen in the other FACT-G subscale scores. Those with high LOC chance scores had lower HHI scores (p<0.001).

Those with high LOC chance had higher HADS anxiety scores and depression scores (p<0.01) (Table 2).

LOC Powerful Others as a Potential Predictor for scores on FACIT-Sp, FACT-G, HHI, HADS

The results of our models indicate that LOC powerful others was not associated with FACIT-Sp Meaning/Peace. Those with higher LOC powerful others scores had decreased FACIT-Sp Faith scores (p=0.006). LOC powerful others scores had no significant association with FACT-G scores, HHI scores, or HADS scores (Table 3).

LOC Internal Control as a Potential Predictor for scores on FACIT-Sp, FACT-G, HHI, HADS

The results of our models indicate that LOC internal control scores had no significant association with FACIT-Sp scores, FACT-G scores, HHI scores, or HADS scores (Table 4).

DISCUSSION

Our study suggests that patients with high LOC chance experience decreased meaning/ peace, faith, QOL, and hope. These patients also experienced increased anxiety and depression at the end of life. The other components of LOC (powerful others and internal control) did not significantly impact physical or mental well-being. Identification of cancer patients with higher levels of LOC chance is important as there is the potential to improve the physical and mental well-being experienced by these patients at the end of life. Interventions that attempt to reduce patients' perceived external control over their life through psychoeducation and empowerment may help patients with high LOC chance learn how to better cope with their disease (22–26).

External Control and QOL

Patients with high external LOC interpret their life situation as being dictated by influences that are outside of their own personal control (2). Within the context of the LOC theory, these external influences are described as a "powerful other" or chance. Individuals that experience high levels of external LOC have the sense that they are powerless over their life and unable to alter their life circumstances (2).

Prior studies have found that an elevated sense of external LOC can have both positive and negative impacts on patients. Some have demonstrated that patients with high external LOC have poor coping skills and may experience increased rates of depression (14, 23, 27). Other studies have shown that an elevated external LOC can allow patients to better adapt to their illness because they are able to separate themselves from their illness and see it as being the responsibility of their physician (a powerful other) (12).

Our study demonstrates that terminally ill cancer patients with high LOC chance scores experience decreased QOL and mental functioning. Patients with a high LOC chance experienced decreased QOL as demonstrated by significantly lower FACT-G total scores (p<0.01) and lower FACT-G Functional Well-being scores (p<0.01). These patients also experienced decreased mental well-being in the form of increased anxiety and depression and decreased hope (p<0.01 for all). Those with high LOC chance scores also experience decreased spiritual well-being as seen by lower FACT-Sp Faith and Meaning/Peace.

Similar relationships have been seen in our investigations of other cancer populations, suggesting that high levels of LOC chance can negatively impact a patient's life (3). The directionality of these relationships is uncertain but suggests that LOC chance may be a possible target for interventions focused on improving physical and mental well-being among terminally ill patients. Perhaps group therapy and other interventions targeted at empowerment/decreasing a sense of LOC chance can positively impact patients' physical and mental well-being. Prior interventions examining the role of group therapy, psychoeducation, and empowerment interventions have noted that patients may experience decreased pain, anxiety and depression when involved in these activities (22–25, 28, 29). It is possible that these types of interventions may be used to encourage terminally ill cancer patients to change their perception of external LOC and the sense of powerlessness and decreased QOL that may go along with that sense of external LOC. Further evaluation into the impact that these interventions may have on an individual's sense of LOC chance should be undertaken as this may be a relatively easy way to improve the physical and mental well-being of terminally ill cancer patients (23, 24).

Interestingly, negative changes in physical and mental well-being were only seen among patients with a high chance external LOC and not among those with a high powerful others external LOC. It is unclear why this may be the case as our multivariate analysis did not demonstrate significant associations between external LOC and patient characteristics such as gender, race, cancer type, education or partner status. Perhaps terminally ill patients with a high powerful others external LOC have come to peace with their diagnosis more fully and have relinquished control to a higher power as compared to those with a high chance external LOC who continue to feel a sense of uncertainty regarding their situation. Interestingly, those with a high powerful others external LOC experienced a statistically significant decrease in FACT-Sp Faith but not in FACT-Sp Meaning/Peace. Those with a high chance external LOC experienced a statistically significant decrease in both FACT-Sp Faith and FACT-Sp Meaning/Peace. These findings suggest that these subpopulations of external LOC types may cope and spiritually process things differently.

Internal Control and QOL

Patients with high internal LOC interpret their life situation as being dictated by their own actions (1). Most prior studies suggest that an increased internal LOC is associated with improved physical and mental well-being (1). Within our population, we did not find any significant associations between internal LOC scores and the FACT-G, FACIT-Sp, HHI or HADS.

Strengths and Weaknesses

Our study provides additional data regarding patient factors that impact physical and mental well-being among patients with terminal cancer. This work is one of the first to examine the impact of patient LOC on physical and mental factors within a terminally ill cancer patient population.

Our study has some limitations. The study group consisted of men and women as well as patients with various types of cancer. Despite our attempts to control statistically for these differences, these fundamental differences may have confounded our data to a certain extent. Additionally, the majority of our patients self- identified as Christian which could also limit generalizability to the general population.

Conclusions

It is imperative that providers continue to explore the impact of LOC on the QOL experienced by terminally ill cancer patients. Our study adds to the growing body of literature suggesting that individuals with high levels of external LOC experience decreased physical and mental well-being. This information gives new insight into factors that can negatively impact a cancer patient's QOL. This is particularly important because Locus of Control has the potential to be a patient factor that may be amenable to psychotherapy interventions such as group therapy, psychoeducation, and empowerment interventions. Future work should continue to explore the impact that LOC has on the individual's QOL and the way that LOC can be modified. We must continue to develop psychotherapy programs that target the negative impact that a high external LOC may have on a patient's QOL so that QOL is no longer left to chance.

Acknowledgments

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Table 1

Demographic Summary

		N (%)	
Gender	Male	48 (48.00%)	
	Female	52 (52.00%)	
Race	Asian/Api	2 (2.02%)	
	Black/African American	14 (14.14%)	
	Latino/Hispanic	2 (2.02%)	
	White/Caucasian	81 (81.82%)	
	Unknown	1	
Education	High School Graduate	28 (28.28%)	
	Some College	39 (39.39%)	
	College And/Or Graduate School	32 (32.32%)	
	Unknown	1	
Marital Status	Married	67 (67.00%)	
	Divorced/Separated	16 (16.00%)	
	Single	7 (7.00%)	
	Widowed	10 (10.00%)	
Religion	Catholic	21 (21.21%)	
	Protestant	15 (15.15%)	
	Baptist	19 (19.19%)	
	Jewish	3 (3.03%)	
	None	3 (3.03%)	
	Other	38 (38.38%)	
	Unknown	1	
Primary Disease	Gyn Onc	10 (10.00%)	
	Breast	11 (11.00%)	
	Lung	24 (24.00%)	
	Head And Neck	8 (8.00%)	
	Gastrointestinal	19 (19.00%)	
	Gu	12 (12.00%)	
	Leukemia	3 (3.00%)	
	Lymphoma	3 (3.00%)	
	N	Mean (SD)	Median	Min-Max
Age	100	60.02 (10.85)	60	35.0 – 91.0
Months since Diagnosis	99	1.38 (1.47)	0.83	0.0 – 5.6
Months until Death/Last-FU	100	12.09 (22.28)	2.88	0.1 – 84.5

Table 2

Locus of Control Chance as a Potential Predictor

Model	Term	Estimate	95% CI	P
FACIT-Sp: Meaning/Peace	LOC: Chance	−0.64	−1.05 – −0.24	**<0.0001**
FACIT-Sp: Faith	LOC: Chance	−0.35	−0.65 – −0.05	**0.0027**
FACT-G: Total	LOC: Chance	−1.05	−2.00 – −0.10	**0.0044**
FACT-G: Physical Well-Being	LOC: Chance	−0.09	−0.46 – 0.28	0.5320
FACT-G: Social Well-Being	LOC: Chance	−0.12	−0.32 – −0.08	0.1100
FACT-G: Emotional Well-Being	LOC: Chance	−0.43	−0.78 – −0.09	0.0015
FACT-G: Functional Well-Being	LOC: Chance	−0.36	−0.70 – −0.02	**0.0071**
Herth Hope Score	LOC: Chance	−0.47	−0.82 – −0.12	**0.0006**
HADS: Anxiety	LOC: Chance	0.33	0.11 – 0.56	**0.002**
HADS: Depression	LOC: Chance	0.27	0.04 – 0.50	**0.0023**

*
Full module included Locus of Control Chance, age, gender, race, education, partnership status, and time since diagnosis as potential predictors

Table 3

Locus of Control Powerful Others as a Potential Predictor

Model	Term	Estimate	95% CI	P
FACIT-Sp: Meaning/Peace	LOC: Powerful Others	−0.34	−0.89 – 0.21	0.107
FACIT-Sp: Faith	LOC: Powerful Others	−0.41	−0.80 – −0.03	**0.0056**
FACT-G: Total	LOC: Powerful Others	−0.52	−1.78 – 0.73	0.2735
FACT-G: Physical Well-Being	LOC: Powerful Others	0.13	−0.34 – 0.59	0.4729
FACT-G: Social Well-Being	LOC: Powerful Others	−0.12	−0.38 – 0.14	0.2378
FACT-G: Emotional Well-Being	LOC: Powerful Others	−0.20	−0.65 – 0.26	0.2556
FACT-G: Functional Well-Being	LOC: Powerful Others	−0.24	−0.68 – 0.21	0.1708
Herth Hope Score	LOC: Powerful Others	−0.33	−0.81 – 0.15	0.0763
HADS: Anxiety	LOC: Powerful Others	0.09	−0.22 – 0.40	0.4287
HADS: Depression	LOC: Powerful Others	0.13	−0.17 – 0.44	0.2579

*
Full module included Locus of Control Powerful Others, age, gender, race, education, partnership status, and time since diagnosis as potential predictors

Table 4

Locus of Control Internal Control as a Potential Predictor

Model	Term	Estimate	95% CI	P
Fact-Sp: Meaning/Peace	LOC: Internal Control	0.09	−0.37 – 0.55	0.6108
FACT-Sp: Faith	LOC: Internal Control	0.05	−0.27 – − 0.38	0.6568
FACT-G: Total	LOC: Internal Control	−0.19	−1.24 – 0.85	0.6249
FACT-G: Physical Well-Being	LOC: Internal Control	−0.18	−0.55 – 0.20	0.2135
FACT-G: Social Well-Being	LOC: Internal Control	0.06	−0.15 – 0.28	0.4353
FACT-G: Emotional Well-Being	LOC: Internal Control	−0.02	−0.41 – 0.36	0.8681
FACT-G: Functional Well-Being	LOC: Internal Control	−0.11	−0.48 – 0.25	0.4156
Herth Hope Score	LOC: Internal Control	−0.03	−0.42 – 0.36	0.8346
HADS: Anxiety	LOC: Internal Control	−0.05	−0.30 – 0.21	0.6300
HADS: Depression	LOC: Internal Control	0.08	−0.17 – 0.33	0.3811

*
Full module included Locus of Control Internal Control, age, gender, race, education, partnership status, and time since diagnosis as potential predictors