Changes in Hope and Power in Lung Cancer Patients Who Exercise

Lisa M. Wall, RN; PhD
Unit Nurse Leader, Memorial Sloan-Kettering Cancer Center, New York, New York

Using Rogers' science of unitary human beings, changes in hope and power among 104 lung cancer patients were examined in relation to participation in a preoperative exercise program. Participants were randomly assigned to exercise or no-exercise and a repeated measures ANOVA was employed. The exercise group's power increased while the no-exercise group's power decreased. No differences in hope emerged. Positive correlations between hope and power were observed. Findings suggest that exercise is a form of knowing participation in change and illustrate a relation between one's ability to envision a better future and one's potential to actualize options through choice.

The purpose of nursing is to promote health and well-being for all persons (Rogers, 1992). Inherent in actualizing this goal is an awareness of the changes that individuals experience as they face disease and the capacity of individuals to participate in the healing process. The need to explore strategies to facilitate one's well-being is nowhere more relevant than in individuals with lung cancer. This year, 164,100 individuals in the United States will be newly diagnosed with lung cancer and approximately 157,000 deaths will be related to this disease (Greenlee, Murray, Bolden, & Wingo, 2000). Individuals with a serious illness, such as lung cancer, experience changes in their sense of well-being and future orientation (Herth, 1993b).

Exercise, like other forms of purposeful movement, has been linked to the promotion of positive feelings, hope, and awareness of potentials in people with cancer (Winningham, 1991) and is a way of consciously exploring the transformation toward maximizing potentials (Lyon, 1981). Cancer patients report increased feelings of hopefulness when engaging in purposeful activities (Raleigh, 1992). The decision to participate in change involves individual choice and potentiates an accelerated experience of change (Rogers, 1970). Barrett (1983) identified power as the way people participate in change through their awareness, choices, freedom to act intentionally, and involvement in creating change. Because the experience of lung cancer gives rise to continuously changing self-perceptions of well-being (Houston & Kendall, 1992), an individual's pursuit of health-promoting strategies also changes over time. Exploration of noninvasive techniques that promote a positive outlook and provide a way for people with lung cancer to participate in their care is of importance to those who face this disease. Therefore, the purposes of this study were to explore changes in hope and power among lung cancer patients in relation to participating in a preoperative exercise program and to examine the relation of hope and power over time.

Conceptual Framework

Rogers' (1992) science of unitary human beings served as the conceptual framework for this study. In this science, individuals with lung cancer, as human beings, are energy fields identified by pattern who bring their own values and beliefs to this experience. Changes that emerge in individuals who participate in current medical treatments for lung cancer, such as surgery, are diverse and not limited to physical, psychosocial, and spiritual manifestations (Houston & Kendall, 1992). Feelings, such as hope and power, emerge from individuals who face the threat that lung cancer and its treatment offer. To envision a "better way" through one's window of hope and to knowingly participate in change are two examples of the infiniteness of human possibilities.

Rogers' (1992) three principles of homeodynamics serve to explain the nature of change. In her principle of *integrality*, Rogers proposed that the human and environmental fields are in continuous mutual process. In her principle of *resonancy*, Rogers hypothesized that change in the patterning of the human field and environmental field is propagated as waves, and it is through these wave patterns that humans perceive their environment. In her principle of *helicy*, Rogers postulated that emerging human and environmental patterns continuously evolve with increased diversity. The processes described within these three principles occur simultaneously and explain the diversity of a human pattern and its manifestations. Therefore, the capacity of individuals with cancer to envision, choose, and purposely participate in activities to fa-

Author's Note: This work is funded in part by a National Research Service Award Individual Grant from the National Institute of Nursing Research at the U.S. Department of Health and Human Services (grant #1 F31 NR07234-01), and the Martha E. Rogers Doctoral Research Award from Upsilon Chapter, Sigma Theta Tau.

Nursing Science Quarterly, Vol. 13 No. 3, July 2000, 234-242

Keywords: exercise, hope, power, lung cancer patients, Rogers' science of unitary human beings

cilitate positive feelings and expectations illustrates the varying manifestations of a human pattern.

Herth (1993a) described hope as the way individuals with cancer envision a better future and work toward actualizing that awareness. The decision to participate in change involves individual choice and potentiates an accelerated experience of change (Rogers, 1986). An individual's awareness and freedom to act intentionally facilitate a person's choices and involvement in creating change. Barrett (1983) identified this process as power and suggested that power is a way people actualize their developmental potentials through their mutual process with the environment.

The literature describes various manifestations of human movement that differ in their substance, intensity, and frequency. "Motion is valued as positive when it enhances our well being, that is, when we feel good in relation to the motion" (Ference, 1986, p. 96). In this study, the preoperative exercise program is conceived as a manifestation of movement. Lyon (1981) suggests that creative movement is a way of consciously exploring the transformation toward healing. The literature supports a positive relation between movement and enhancement of self (Goldberg & Fitzpatrick, 1980; Macvicar & Winningham, 1986). Hopeful individuals are active in goal-directed activities (Raleigh, 1992; Winningham, 1991), and individuals with greater power in knowing participation in change appear more likely to engage in activities, such as exercise, that are directed toward fulfillment of their hopes. Although the relations among hope, power, and exercise have not been previously studied, the literature suggests a positive relation between hope and power and their respective relation with exercise.

Related Literature

Hope

Cancer is often seen as a life-threatening disease with a foreboding future for its victims. As an individual's refusal to accept an intolerable situation as final, "hope is the act by which this temptation to despair is actively or victoriously overcome" (Marcel, 1978, p. 36). Herth (1993a) defined hope as an individual's dynamic inner capacity that enables transcendence of the present situation and fosters a positive new awareness of being. This conceptualization of hope is consistent with Rogers' (1992) science and was used in this study. Through this conceptualization of hope, it is recognized as a human capacity to simultaneously perceive the present challenges in relation to future opportunities. The capacity to transcend the present and imagine a future beyond one's known experiences reflects hope's dynamic nature and has been supported in the literature. In a qualitative study of 10 terminally ill adults, Herth (1990) explored hope over time. Patients were interviewed upon admission to a hospice, at the onset of a severe impairment in their ability to perform activities of daily living, and when symptoms indicated that death would probably occur within 2 weeks. As their illnesses progressed, patients' goals became more global and hopes focused less on self and more on others. In the final stages of illness, hopes appeared directed back on self with a focus on "being" rather than "having or doing." Findings suggest that hope changes in intensity and direction over time.

Fromm (1968) theorized hope to be a decisive element in any attempt to bring about change in the direction of greater aliveness, awareness, and reason. This is evident in Frankl's (1984) description of the positive relation between hope and survival among prisoners of concentration camps. "The experiences of camp life show that man [*sic*] does have a choice of action" (Frankl, 1984, p. 86). Frankl recalled those prisoners who lived in the happy memories of the past rather than face the frightening reality of the present and the uncertainty of the future. He suggested that by robbing the present of its reality, it became easy to overlook chances to make something positive of camp life. To Frankl, camp life offered an opportunity and a challenge. Like the concentration camp, cancer engages its victims in a similar paradox. Herth (1993a, 1993b) found hope to be a reality-based expectation that mobilizes an individual to move beyond what is and envision a better tomorrow through purposeful activities. Positive relations between hope and involvement in activities (Raleigh, 1992) and between hope and treatment decisions (Cassileth, Zupkis, Sutton-Smith, & March, 1980) have been found in cancer patients.

Power

Barrett's (1983) conceptualization of power is derived from Rogers' (1970) science of unitary human beings and is defined as the capacity to knowingly participate in change. Barrett described power as the way humans actualize their developmental potentials, and it is characterized by awareness, choices, freedom to act intentionally, and involvement in creating change. Similarly, Buhler (1965) conceived of people as living with intentionality or purpose. Furthermore, Buhler suggested that it is through this intentionality that individuals give meaning to life.

Central to the notion of knowing participation in change is an awareness of the available options, choice, and intentionality. These characteristics were found to be predictors of exercise behavior in a retrospective survey of 110 patients undergoing treatment for colorectal cancer (Courneya & Friedenreich, 1997). Participation in exercise during cancer treatment was found to be related to intention ($r = .39$, $p < .001$), exercise patterns ($r = .53$, $p < .001$), perceived control ($r = .37$, $p < .001$), attitude ($r = .38$, $p < .001$), control beliefs ($r = .27$, $p < .01$), and behavioral beliefs ($r = .37$, $p < .001$). These findings offer further support to the capacity of people to change in relation to an awareness of options, the value held for those options, choice, and intention.

Preoperative Exercise Program

The preoperative exercise program was conceptualized through Rogers' (1992) science as a series of purposeful movements directed toward the optimal well-being of lung cancer patients pre-

Table 1
Preoperative Exercise Program

Exercises	Instructions	Frequency
Sniff and blow breathing exercise	In a sitting or standing position, sniff twice and hold your breath for 2 seconds. Slowly blow out through pursed lips as though you were whistling.	Repeat 5 times 2 times per day
Arm exercise	Sit or stand with arms stretched out and parallel to the floor. Take a slow, deep breath in as you raise both arms up over your head keeping arms straight. Hold your breath for 2 seconds while holding your arms straight over your head. Slowly blow out your breath through pursed lips while lowering your arms back to your side.	Repeat 10 times 2 times per day
Leg exercise	While in a sitting position, lift one leg off the chair. Straighten and extend the leg. (Make sure your leg is not resting on the chair.) Extend leg out and hold for 3 seconds. Lower leg to resting position and repeat with other leg.	Repeat cycle 10 times 2 times per day
Walking exercise	Walk at a comfortable pace. Distance is the goal.	1 mile each day
Stairclimbing exercise	Climb up and down steps slowly and steadily. Remember to avoid holding your breath as you climb and blow out through pursed lips.	40 steps 2 times per day

paring for surgery. As a manifestation of human movement, exercise involves choice, change, and motion (Wall, 1999). The preoperative exercise program, as displayed in Table 1, was operationalized as a 7- to 10-day home-based program that included walking, stairclimbing, and arm, leg, and breathing exercises. This exercise program, as one expressive of health, is a good example of unitary characteristics. If exercise is to be optimal, it must be of appropriate rhythmicity, periodicity, and intensity for a given human field. For lung cancer patients anticipating surgical resection, walking, stairclimbing, and arm, leg, and breathing exercises meet this criterion (Ginsberg, 1995). The literature on the changes exercise facilitates in preoperative thoracic patients is scant and focuses on the physical benefits (Nomori, Kobayashi, Fuyuno, Morinaga, & Yashima, 1994). Evidence of other benefits of exercise can be found in studies of cancer and pulmonary patients. No studies to date have explored the relation of hope, power, and exercise in lung cancer patients.

Studies of cancer patients demonstrated the relation of exercise and changes in human field manifestations, such as fatigue, self-concept, and mood (Macvicar & Winningham, 1986; Mock et al., 1994). Macvicar and Winningham (1986) reported decreased feelings of tension-anxiety, depression-dejection, and fatigue and increased feelings of vigor in breast cancer patients who participated in an exercise program. Mock et al. (1994) found that breast cancer patients improved their physical tolerance after completing an exercise program (ρ = .44, p = .05). Findings from studies involving chronic pulmonary patients also supported the positive relation between exercise and feelings of well-being. Reardon, Patel, and ZuWallack (1993) found substantial improvement in exercise endurance and quality of life in individuals who participated in a pulmonary rehabilitation program. In another study of patients with chronic lung disease, Kerstein (1990) found that participation in a 3-week pulmonary rehabilitation program was related to an improvement in patients' self-concept (t = 8.7, $p < .0001$) that was unchanged 2 to 6 months after discharge (t = –0.9, p = .39). Findings reflect an improved sense of well-being and the sustaining influence of exercise. Similar to the present study, both Reardon et al. (1993) and Kerstein (1990) used walking and arm, leg, and breathing exercises in their respective studies.

Significance of the Study

The science of unitary human beings provides knowledge for the imaginative promotion of well-being of all people (Rogers, 1970). The need to design ways to facilitate one's well-being is nowhere more relevant than for individuals with lung cancer. Lung cancer is fatal in more than 85% of those who contract it (Parkin, Pisani, & Ferlay, 1999). Exploration of noninvasive techniques that facilitate hope and power in individuals with lung cancer is of importance to individuals who face this disease. Little clinical research has been conducted to test interventions designed to inspire hope (Tollett & Thomas, 1995), and none has explored the relation of hope and exercise. Like hope, most studies on power have used cross-sectional designs; few have employed longitudinal or experimental designs (Caroselli & Barrett, 1998), and none to date have explored power in cancer patients or in relation to hope or exercise. Therefore, the investigation of the changes in hope and power among lung cancer patients who participate in a preoperative exercise program contributes to an understanding of the dynamic nature of these two concepts and their unique and complementary roles in serving individuals throughout illness.

Research Questions

1. Does hope differ over time in lung cancer patients who do and do not participate in a preoperative exercise program?
2. Does power differ over time in lung cancer patients who do and do not

participate in a preoperative exercise program?
3. What is the relation of hope and power in lung cancer patients who do and do not participate in a preoperative exercise program at each of three times?

Methods

Sample

Preoperative lung cancer patients with a clinical diagnosis of stage IA, IB, IIA, IIB, or IIIA non–small cell carcinoma were recruited from a medical center in New York City. Non-probability purposive sampling was used to obtain a sample of 104, which was consistent with Cohen's (1988) recommendation for a medium effect size ($f^2 = .25$), a power of .80, and a statistical significance level of .05. All participants were determined to be able to perform the prescribed exercises by their surgeon and were not involved in any other exercise program. All participants were high school graduates as required by the Power as Knowing Participation in Change Test, Version II (PKPCT, VII) (Barrett, 1987). Patients who had received chemotherapy or radiation therapy were excluded, because treatment-related symptoms, such as fatigue, have been related to decreases in hope (Herth, 1993a).

Design

Participants were randomly assigned to the exercise or no-exercise group using sealed envelopes with randomization instructions prepared by the hospital's biostatistical department. To assess the changes over time in hope and power in relation to participating in the exercise program, a repeated measures ANOVA design was employed whereby hope and power were measured at three points in time. The first point in time (T_1) was 7 to 10 days before surgery at the time of diagnosis. The second time point (T_2) was the day before surgery and for the exercise group coincided with the completion of the exercise program. The third time point (T_3) was 4 to 6 days after surgery and prior to the participants' receiving information regarding their final surgical pathology because prognostic information has been related to changes in hope for cancer patients (Raleigh, 1992). To evaluate the relation of hope and power over time, a Pearson product-moment correlation coefficient was calculated for the total sample at all three times. The Statistical Package for the Social Sciences (SPSS, version 7.5 for Windows, 1996) was used to analyze the data.

Instruments

Demographic data. A personal data sheet elicited demographic information.

Herth Hope Index (HHI). Hope was measured with the HHI (Herth, 1992), a 12-item, 4-point Likert-type format, with item scores ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) that yield a total hope score ranging from 12 to 48. A high score indicates a high level of hope. Concurrent, divergent, and construct validity are well established; internal consistency and test-retest reliability have been confirmed (Herth, 1992). Concurrent validity was assessed by calculating the correlations between the HHI and three other hope instruments. Comparison with a hopelessness scale was used to assess divergent validity. Construct validity was assessed by using maximum likelihood factor analysis with VARIMAX rotation, which resulted in a three-factor solution accounting for 61% of the variance. An initial Cronbach coefficient alpha of .97 was computed in a sample of 172 adults who were acutely ill ($n = 70$), chronically ill ($n = 71$), and terminally ill ($n = 30$). The test-retest correlation calculated 2 weeks later was .91. In this study, the total alpha coefficient for the HHI was .86 at T_1, T_2, and T_3. Mean inter-item correlations of .38 (.12 to .72), .36 (.14 to .74), and .36 (.12 to .67) were found at T_1, T_2, and T_3, respectively. These weak to moderate correlations indicate that the items share some of the variance in measuring hope and support its use as a unitary measure.

PKPCT, VII. The revised PKPCT (Barrett, 1987) is a 52-item semantic differential test that measures power. It contains four subscales, each consisting of 12 pairs of bipolar adjectives that measure different field behaviors characterizing power, namely, awareness, choices, freedom to act intentionally, and involvement in creating change. Each item has a value of 1 to 7 in the direction of lower to higher frequency pattern manifestation. The range of scores for the total instrument is 48 to 336, with higher scores indicating greater power. Construct validity of the scales was supported by factor analysis. Factor loadings, as validity coefficients of .57 to .90 in the pilot study and .56 to .70 for the validation study, were found (Barrett, 1983). In both studies, one factor emerged that accounted for 43% of the variance in the pilot study and 48% of the variance in the validation study. In their overview of studies using the PKPCT, Caroselli and Barrett (1998) reported Cronbach's alpha coefficients ranging from .91 to .97. In this study, the internal consistency of the PKPCT, VII was high for the total measure at all three times (.93 at T_1, .96 at T_2, and .97 at T_3). Mean inter-item correlations of .33 (.03 to .88) were found at T_1, T_2, and T_3 and suggest that the items are not independent of each other and that nuances in power exist within this unitary measure.

Procedure

Approval from the hospital's Institutional Review Board was obtained. Participants were identified by their surgeon during the preoperative consultation. The principal investigator gave a verbal description of the study before the consent form was signed. All participants completed the HHI and PKPCT at T_1, T_2, and T_3. At T_1, participants completed the first set of instruments and a demographic form. Participants were then randomized to either the exercise or no-exercise group. Participants randomized to the exercise group were instructed on the exercises by the principal investigator. To ensure proper technique, each of these patients was asked to give a return demonstration and was given written instructions of the program. The exercise group was

instructed to exercise every day prior to surgery and record their compliance in a daily log.

Results

The sample consisted of 104 lung cancer patients. Ninety-seven patients completed the study, 49 in the exercise group and 48 in the no-exercise group. Of the 7 patients who did not complete the study, 1 chose not to have surgery and was lost at T_2, and 6 did not have a surgical resection because of findings of positive lymph nodes at the time of surgery. These patients were lost at T_3.

Descriptive statistics were computed for hope and power at T_1, T_2, and T_3. Because both were found to be slightly and negatively skewed, reflection and square root transformation of the hope and power scores were employed to improve the shape of the distributions. Because no statistically significant differences related to demographics were found between the two groups, scores were computed for the total sample. Ages ranged from 37 to 83 years with a median age of 65 years. All participants had a minimum of a high school diploma and approximately 39% held a baccalaureate degree or higher. Most of the participants were male (53.8%), White (92.3%), and married (73.1%); more were employed (45.2%) than were in other categories (e.g., unemployed, on sick leave, or retired). Participants randomized to exercise (n = 53) were assigned a program that ranged from 1 to 20 days with a mean of 7 days. Variance from the defined program occurred because of changes in the patients' or surgeons' schedules and could not be controlled. No statistically significant relations between either hope or power and the number of days of exercise were found. An overall compliance rate of 83% was reported.

The first research question asked, "Does hope in lung cancer patients vary over time as a function of participation in a preoperative exercise program?" As displayed in Table 2, no statistically significant differences were observed between groups, $F(2, 190) = 2.55$, $p = .08$.

Table 2
Summary of Repeated Measure Analysis of Variance on Hope Using Reflected and Transformed Data

Source	*SS*	*df*	*MS*	*F*	*p*
Between-subjects					
Intercept	3,505.145	1	3,505.145	1,792.871	< .001
Exercise	2.290	1	2.290	1.171	.282
Error	185.729	95	1.955		
Within-subjects					
Hope	0.286	2	0.143	0.511	.601
Hope * Exercise	1.428	2	0.714	2.553	.081
Error	53.117	190	0.280		

NOTE: $N = 97$.

Bonferroni-adjusted series of paired t tests were computed using a critical value of $p < .017$ to assess the changes in hope over time within each group, of which none were statistically significant. Mean hope scores for both groups were high at each time point, indicating an overall robustness of the participants' hope throughout the perioperative period (see Table 3).

The second research question asked, "Does power in lung cancer patients vary over time as a function of participation in a preoperative exercise program?" Unlike hope, differences emerged in the patterns of power for the two groups over time, $F(2, 190) = 12.09$, $p < .001$. These patterns are displayed in Table 4 and Figure 1. Power increased in the exercise group from T_1 to T_2, $t(51) = –2.68$, $p = .01$. Although the difference in power from T_2 to T_3 was not statistically significant, $t(48) = –1.89$, $p = .07$, a steady increase in power was found in the exercise group from T_1 to T_3, $t(48) = –3.73$, $p = .001$, suggesting that exercise may have a sustaining influence on power. On the other hand, power decreased T_1 to T_2 in the no-exercise group, $t(50) = 2.72$, $p < .01$. This diminished power was sustained from T_2 to T_3, $t(47) = –.29$, $p = .78$. Further inspection of these findings revealed an 18% variance accounted for in power as it related to participating in the exercise program ($\eta^2 = .18$). Next, a series of one-way ANOVAs were performed to assess the mean power differences between groups at T_1, T_2, and T_3. No difference was found at T_1, $F(1, 143) = .25$, $p = .62$, indicating that the two groups had similar power at the start of the study. Differences observed at T_2, $F(1, 143) = 4.77$, $p = .03$, and T_3, $F(1, 143) = 11.13$, $p < .01$, reflected greater change over time in relation to participating in the exercise program. To further investigate the changes in power within each group, a Bonferroni-adjusted series of paired t tests was computed using a critical value of $p < .017$. Statistically significant mean differences in power were obtained in the exercise group from T_1 to T_2, $t(51) = –2.68$, $p = .01$, and T_1 to T_3, $t(48) = –3.73$, $p = .001$, but not from T_2 to T_3. In the no-exercise group, the mean difference was significant only from T_1 to T_2, $t(50) = 2.72$, $p = .009$. These findings suggest that the exercise group's power increased after completing the program and sustained this higher level of power through T_3, whereas the no-exercise group's power decreased from T_1 to T_2 and stayed lowered through T_3.

The third research question asked, "What is the relation of hope and power in lung cancer patients who do and do not participate in a preoperative exercise program as measured at three points in time?" Because no statistically significant differences were found between the exercise and no-exercise groups at any point in time, correlations are reported for the entire sample. Using a bivariate Pearson product-moment correlation test, correlations were obtained at T_1 ($r = .62$, $p < .001$), T_2 ($r = .59$, $p < .001$), T_3 ($r = .64$, $p < .001$), and overall ($r = .70$, $p < .001$), which reflect

Table 3
Range of Scores and Mean Scores on the Herth Hope Index and the Power as Knowing Participation in Change Test for the Exercise and No-Exercise Groups at T_1, T_2, and T_3

Variable Over Time	Group	Range	*M*	*SD*	*n*
Hope at T_1	Exercise	29-48	41.1	5.1	53
	No-exercise	31-48	41.5	4.6	51
	Overall	29-48	41.3	4.9	104
Hope at T_2	Exercise	31-48	42.3	4.2	52
	No-exercise	27-48	41.0	5.0	51
	Overall	27-48	41.6	4.7	103
Hope at T_3	Exercise	31-48	42.6	4.5	49
	No-exercise	30-48	41.3	4.8	48
	Overall	30-48	42.0	4.7	97
Power at T_1	Exercise	198-336	274.1	37.0	53
	No-exercise	178-336	277.5	36.1	51
	Overall	178-336	275.8	36.4	104
Power at T_2	Exercise	184-336	284.7	39.3	52
	No-exercise	160-336	267.2	43.9	51
	Overall	160-336	276.0	42.3	103
Power at T_3	Exercise	183-336	292.3	39.3	49
	No-exercise	175-336	266.3	45.5	48
	Overall	175-336	279.5	44.2	97

Table 4
Summary of Analysis of Variance for the Exercise Group With Repeated Measures on Power Using Reflected and Transformed Data

Source	*SS*	*df*	*MS*	*F*	*p*
Between-subjects					
Intercept	17,787.54	1	17,787.54	895.104	< .001
Exercise	81.267	1	81.267	4.09	.046
Error	1,887.843	95	19.872		
Within-subjects					
Power	12.949	2	6.475	2.554	.08
Power * Exercise	61.322	2	30.661	12.094	< .001
Error	481.679	190	2.535		

NOTE: $N = 97$.

a positive and moderate relation between hope and power over time.

Discussion and Conclusions

In explaining the similar manifestations of hope found in both groups, one must envision both groups in mutual process with the environment. Rogers (1992) described the mutuality of the human and environmental fields in her principle of integrality. The high levels of hope displayed by the participants and the lack of detectable differences between the two groups indicate that these individuals had positive expectations of their future and envisioned options to actualize these beliefs. Participants envisioned surgery as the way to deal with their lung cancer and positively perceived their capacity to actualize this option. It seems that these individuals realistically faced the crisis lung cancer presented to them in a positive and purposeful manner. As one participant stated, "I understand the severity of my problem and found the best place for treatment. I am confident that I'll see this through." Another echoed similar sentiments when he said, "I just know I'll get through this. I've faced worse situations. I have complete confidence in the outcome of the surgery."

This notion of purposefulness is essential in understanding hope. In a quasi-experimental study of 33 homeless veterans (Tollett & Thomas, 1995), increases in hope were found in those who participated in group therapy as compared to the control group ($F = 8.93$, $p = .006$). Group therapy was structured "in an effort to create an environment conducive to hope" (p. 84) by building social networks, promoting teamwork, and nurturing the group members. This suggests that the veterans viewed group therapy as a viable means to change their situation for the better. Perhaps, if in this study the preoperative exercise program was deemed necessary to be eligible for surgical resection, different results would have emerged.

Therefore, through Rogers' (1992) description of the mutual process of individuals and the environment, three dynamics of hope emerge. First, hope is purposeful. This speaks to the importance of recognizing the personal perception of a threat to well-being and developing timely, appropriate, and participant-valued interventions. Nursing interventions must be valued by individuals as directly related to helping them overcome their perceived threat. Second, hope is realistic. Although threatened individuals must believe in the capacity of the intervention, they must also believe in their ability to use it. Solutions must be perceived as viable and available. Nurses need to illuminate, teach, support, and encourage the use of these options. Finally, hope can be sustained over time through changing circumstances. Differences in the way individuals hope may be related to changes in the focus of hope. Even though daily issues and expectations changed throughout the perioperative period, the goal of cure through surgery remained the focus of these participants. The role of nurses is to promote a flexible environment where changes in individual goals are promptly recognized and new options are made available.

The overall high power scores at T_1 suggest that participants in both groups were knowingly participating in change

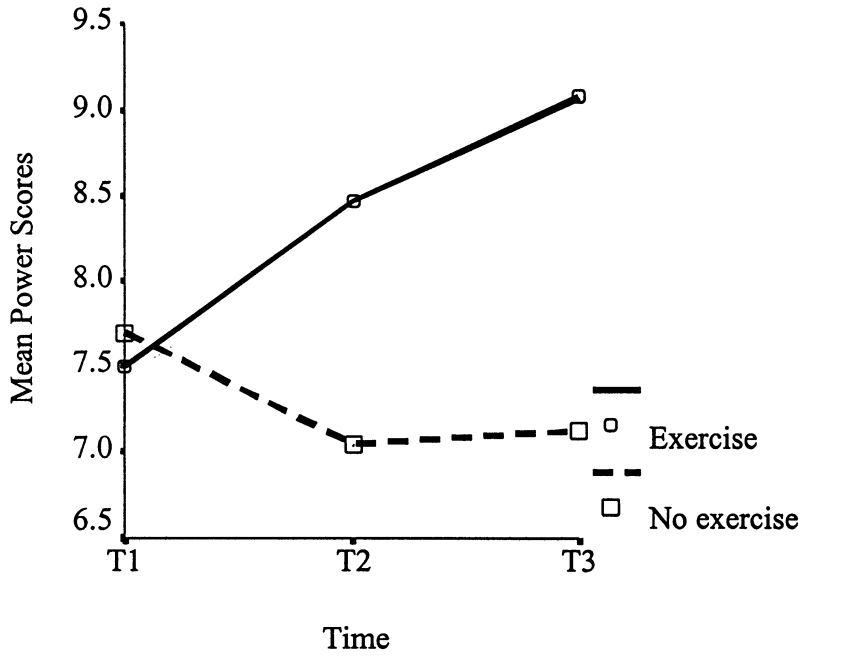

Figure 1. Power Over Three Points in Time for the Exercise Group and the No-Exercise Group Using Reflected and Square Root Transformed Data

as they sought treatment for their disease. However, unlike hope, differences emerged in the patterns of power for the two groups. The exercise group knowingly and actively increased the intensity of their participation in their care, whereas the no-exercise group did not. The different direction and rhythm of change in power among the two groups can be explained through Rogers' (1992) science. Manifestations of field differences emerge out of the mutual human-environment field process. Findings from this study illustrate the dynamic nature of power and the capacity of individuals to actualize their power in mutual process with the environment.

The overall compliance rate of 83% for the exercise group reflects their active participation in the program. Of interest, degree of participation and power were not related. All of the daily logs were completed and each participant in the exercise group provided the reason(s) for not completing the daily exercise program. This behavior may be indicative of the participants' choice to perform or not to perform certain exercises on specific days and illustrates their freedom to knowingly participate in the program. Findings related to power are relevant to nursing practice. The increase in the exercise group's power reflects their amplified knowing participation in change. The decrease in the no-exercise group's power suggests that they perceived themselves as less participative in the change process. Findings suggest that enhancing or inhibiting power is related to a tangible activity that necessitates choice and knowing participation. Strategies designed to facilitate power need to be purposeful, tangible, and clear. Although the preoperative exercise program is one example, activities need not be limited to the physical realm. Unlike hope, power is not dependent on the existence of a threat. Perhaps participation in this exercise program was viewed as an activity to enhance one's preparedness for surgery and not as a solution to the primary problem of lung cancer. The fact that this exercise program facilitated feelings of power and did not enhance feelings of hope is an important distinction that demonstrates the complexity of the human experience with cancer and its treatments. Humans are not unidimensional beings who sequentially deal with circumstances or feelings. Instead, as pandimensional beings, individuals face multiple issues simultaneously. Therefore, when developing strategies to assist people, consideration must be given so as not to lose sight of the whole person while focusing on a particular manifestation of a person's pattern.

The moderate to strong relations between hope and power found at each of the three times support the notion that individuals who knowingly and actively participate in their care have a more positive outlook than those who are passive participants. In a study of 76 women with breast cancer, Bouchard (1992) found a moderate relation between hope and health-promoting lifestyle ($r = .65, p < .001$), indicating that a person with cancer who has a positive and futuristic orientation is more likely to engage in health-promoting behaviors. Similarly, Cassileth et al. (1980) found higher hope in cancer patients who were actively involved in treatment decisions. Rogers (1970) proposed that "people must be informed and active participants in the search for health" (p. 134). Individuals confronted with lung cancer and the life-changing events that cancer brings often perceive challenges to the integrity of their human field. Hope is the capacity to make expectations fluid and not be overcome by the "absoluteness" of the present (Farran, Herth, & Popovich, 1995). Power is the capacity to participate in the innovative patterning of the human and environmental field (Barrett, 1983). It is through these two manifestations of a human pattern that one becomes conscious of choices and is able to actualize change. Nursing interventions that encourage active involvement in change incorporate an understanding of this dynamic process and recognize the unique capabilities and resources of individuals with cancer.

Implications for Future Research and Practice

The use of Rogers' (1992) science of unitary human beings to generate an increased understanding of human patterns and how people can effectively

participate in change is warranted. Specifically, exploration of non-invasive strategies that facilitate well-being in lung cancer patients is needed. Examining hope and power throughout the course of different illnesses would provide additional information regarding these manifestations. Future research is needed to investigate the relation between exercise and other human manifestations. In addition, use of this conceptualization of exercise in future empirical studies is warranted. Using different activities in other populations will help validate its theoretical interpretation as a manifestation of movement and its usefulness as a nursing intervention.

Findings from this study also have implications for nursing practice. For example, the fact that the number of days of exercise made no difference in the patterning of hope or power speaks to the unique experience of patterning and the need to individualize nursing care. Through the preoperative exercise program, individuals demonstrated their capacity to knowingly participate in change. This human ability to change involves an openness to new ideas or ways. Nurses play a role in enlightening individuals about the options available to them while recognizing an individual's capacity to choose. In this study, the exercise group maintained a daily log of their compliance with the preoperative exercise program. By sharing their level of participation in the exercise program and the reasons for choosing not to perform exercises on specific days, these individuals demonstrated an awareness of their situation, a capacity to make purposeful decisions, and a propensity to actively participate in their care. The use of strategies, such as the daily log, facilitates the individualization of care by encouraging people to identify facilitators and inhibitors specific to them in actualizing the intervention that can be incorporated into their care. Nurses need to capitalize on this process by working with individuals to increase their awareness of realistic options and facilitate their actualization of possibilities.

References

Barrett, E.A.M. (1983). *An empirical investigation of Martha E. Rogers' principle of helicy: The relationship of human field motion and power.* Unpublished doctoral dissertation, New York University, New York.

Barrett, E.A.M. (1987). *Development of an instrument to measure power as knowing participation in change*. Unpublished manuscript.

Bouchard, L. (1992). *The relationship among eudaimonistic conception of health, internal cancer locus of control, hope and health-promoting lifestyle in women with breast cancer.* Unpublished doctoral dissertation, New York University, New York.

Buhler, C. (1965). Some observations on the psychology of the third force. *Journal of Humanistic Psychology*, *5*, 54.

Caroselli, C., & Barrett, E.A.M. (1998). A review of the power as knowing participation in change literature. *Nursing Science Quarterly*, *11*, 9-16.

Cassileth, B. R., Zupkis, R. V., Sutton-Smith, K., & March, V. (1980). Information and participation preferences among cancer patients. *Annals of Internal Medicine*, *92*, 832-836.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

Courneya, K. S., & Friedenreich, C. M. (1997). Determinants of exercise during colorectal cancer treatment: An application of the theory of planned behavior. *Oncology Nursing Forum*, *24*, 1715-1723.

Farran, C. J., Herth, K. A., & Popovich, J. M. (1995). *Hope and hopelessness: Critical clinical constructs*. Thousand Oaks, CA: Sage.

Ference, H. M. (1986). The relationship of time experience, creativity traits, differentiation, and human field motion. In V. Malinski (Ed.), *Explorations on Martha Rogers' science of unitary human beings* (pp. 95-105). Norwalk, CT: Appleton-Century-Crofts.

Frankl, V. E. (1984). *Man's search for meaning* (rev. ed.). New York: Washington Square Press.

Fromm, E. (1968). *The revolution of hope*. New York: Harper & Row.

Ginsberg, R. J. (1995). Preoperative assessment of the thoracic surgical patient: A surgeon's viewpoint. In F. G. Pearson, J. Desclauriers, R. J. Ginsberg, C. A. Hiebert, M. F. McKneally, & H. C. Urschel, Jr. (Eds.), *Thoracic surgery* (pp. 29-36). New York: Churchill Livingstone.

Goldberg, W. G., & Fitzpatrick, J. J. (1980). Movement therapy with the aged. *Nursing Research*, *29*, 339-346.

Greenlee, R. T., Murray, T., Bolden, S., & Wingo, P. A. (2000). Cancer statistics, 2000. *CA: A Cancer Journal for Clinicians*, *50*, 7-33.

Herth, K. (1990). Fostering hope in terminally ill people. *Journal of Advanced Nursing*, *15*, 1250-1259.

Herth, K. (1992). Abbreviated instrument to measure hope: Development and psychometric evaluation. *Journal of Advanced Nursing*, *17*, 1251-1259.

Herth, K. (1993a). Hope in older adults in community and institutional settings. *Issues in Mental Health Nursing*, *14*, 139-156.

Herth, K. (1993b). Hope in the family caregiver of terminally ill people. *Journal of Advanced Nursing*, *18*, 538-548.

Houston, S. J., & Kendall, J. A. (1992). Psychosocial implications of lung cancer. *Nursing Clinics of North America*, *27*(3), 681-690.

Kerstein, L. (1990). Changes in self-concept during pulmonary rehabilitation, part I. *Respiratory Care*, *19*, 456-462.

Lyon, B. (1981). *Dance toward wholeness: Moving methods to heal individuals and groups*. Austin, TX: The Sharing Company.

Macvicar, M. G., & Winningham, M. L. (1986). Promoting the functional capacity of cancer patients. *Cancer Bulletin*, *38*, 235-239.

Marcel, G. (1978). *Homo viator: Introduction to a metaphysic of hope*. Gloucester, UK: Peter Smith.

Mock, V., Burke, M. B., Sheehan, P., Creaton, E. M., Winningham, M., McKenney-Tedder, S., Schwager, L. P., & Liebman, M. (1994). A nursing rehabilitation program for women with breast cancer receiving adjuvant chemotherapy. *Oncology Nursing Forum*, *21*, 899-906.

Nomori, H., Kobayashi, R., Fuyuno, G., Morinaga, S., & Yashima, H. (1994). Preoperative respiratory muscle training: Assessment in thoracic surgery patients with special reference to post- operative pulmonary complications. *Chest*, *105*, 1782-1788.

Parkin, D. M., Pisani, P., & Ferlay, J. (1999). Cancer statistics, 1999. *CA: A Cancer Journal for Clinicians*, *49*, 33-48.

Raleigh, E. D. (1992). Sources of hope in chronic illness. *Oncology Nursing Forum*, *19*, 443-448.

Reardon, J., Patel, K., & ZuWallack, R. L. (1993). Improvement in quality of life is unrelated to improvement in exercise endurance after outpatient pulmonary rehabilitation. *Journal of Cardiopulmonary Rehabilitation*, *13*, 51-54.

Rogers, M. E. (1970). *An introduction to the theoretical basis of nursing*. Philadelphia: F. A. Davis.

Rogers, M. E. (1986). Science of unitary human beings. In V. M. Malinski (Ed.), *Explorations on Martha Rogers' science of unitary human beings* (pp. 1-8). Norwalk, CT: Appleton-Century-Crofts.

Rogers, M. E. (1992). Nursing science and the space age. *Nursing Science Quarterly*, *5*, 27-34.

Tollett, J. H., & Thomas, S. P. (1995). A theory-based nursing intervention to instill hope in homeless veterans. *Advances in Nursing Science*, *18*, 76-90.

Wall, L. M. (1999). Exercise: A unitary concept. *Nursing Science Quarterly*, *12*, 68-72.

Winningham, M. L. (1991). Walking program for people with cancer: Getting started. *Cancer Nursing*, *14*, 270-276.