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JOURNAL CLUB ARTICLE

Exercise and Quality of Life:
Strengthening the Connections

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Exercise improves quality of life (QOL) in people with cancer. Most oncology healthcare providers recognize the statement to be true because the research literature provides strong support for the physical and psychological benefits of exercise. Because the terms *exercise*, *QOL*, and *people with cancer* have different meanings, the contextual connections in which they are used are important to understanding the relationship between exercise and QOL in people with cancer. This article explores the links between exercise and QOL in people with cancer and examines issues that impact the development, implementation, and evaluation of exercise programs for people with cancer. Issues related to exercise goal development, exercise prescription, exercise testing, exercise adherence, and methods to evaluate the efficacy of exercise in relation to QOL are discussed.

The connections between exercise and improved physical and psychological health have been well established. The benefits apply to healthy people as well as those with chronic illness such as cancer (Courneya & Friedenreich, 1999; Galvao & Newton, 2005; Knols, Aaronson, Uebelhart, Fransen, & Aufdemkampe, 2005; McNeely et al., 2006; Schmitz et al., 2005; Stevinson, Lawlor, & Fox, 2004). In people with cancer, the research literature firmly supports the notion that exercise improves quality of life (QOL) (Courneya, Mackey, et al., 2003; Courneya, Segal, Gelmon, et al., 2007; Courneya, Segal, Mackey, et al., 2007; Milne, Wallman, Gordon, & Courneya, 2008; Monga et al., 2007; Segal et al., 2003). The potential benefits associated with exercise in people with cancer include diminished symptomatology, enhanced functional capacity, and improved physical and psychological well-being. However, *exercise*, *QOL*, and *people with cancer* are broad terms that may have different meanings. To gain a full understanding, the sentence "Exercise improves QOL in people with cancer" must be broken down and its phrases analyzed separately to appreciate the various contextual connotations. The purpose of this article is to explore in greater detail the links between exercise and QOL in people with cancer and to examine issues that impact the development, implementation, and evaluation of exercise programs for people with cancer. Topics to be addressed include characterization of QOL outcomes in exercise studies, exercise goal development, exercise prescriptions, exercise testing, exercise adherence, methods to evaluate the efficacy of exercise in relation to QOL, and translation of research into practice.

At a Glance

- The potential quality-of-life improvements associated with exercise in patients with cancer include diminished symptomatology, enhanced functional capacity, and improved perceptions of health.
- The Revised Wilson and Cleary Model for Health-Related Quality of Life provides a conceptual framework for approaching quality-of-life assessment, including outcomes associated with exercise in patients with cancer.
- The overall goals of the exercise program and unique needs of patients and the target cancer population guide the development of the tailored exercise prescription.

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Exercise Improves Quality of Life in People With Cancer

Exercise

A recent initiative, the President's Challenge, launched in March 2008, encouraged Americans of all age groups to "get moving" and improve their physical fitness through increased physical activity and exercise (President's Council on Physical Fitness and Health, 2008). Given the national push for improving the physical fitness of Americans, interest in enhancing physical fitness in people with chronic conditions also has intensified, which includes people with cancer.

Understanding the key terms *physical activity* and *exercise* is important. Physical activity refers to movement of the body and increased energy expenditure that occurs in response to skeletal muscle contraction (Whaley, Brubacker, & Otto, 2006). Physical activity encompasses all bodily movements, from typing on a keyboard to housekeeping activities to structured exercise routines. Free-living physical activity refers to activities that occur within the confines of daily living. Exercise, on the other hand, is a specific type of physical activity, consisting of structured, repetitive body movements executed to improve or maintain physical fitness (Whaley et al.). The most common types of exercise are aerobic, strength training, and flexibility.

All healthcare providers strive to improve the QOL of the people they serve. Improving QOL is particularly salient for nurses, given their holistic approach to providing patient care.

Cancer and the treatment of cancer impact multiple aspects of people's lives and frequently result in numerous short- and long-term physical and psychological sequelae. Implementing an exercise program in people with cancer presents unique challenges, which differ depending on the diagnosis, current treatment, time since treatment, potential short- and long-term effects of the treatment, and comorbid conditions. Given the heterogeneous nature of cancer and its treatment, the goals of an exercise program are likely to vary from one group to the next. Possible goals of an exercise program include improving cardiorespiratory fitness, flexibility, and body composition; restoring and maintaining muscular strength and endurance; and alleviating symptoms such as fatigue.

The specific goals of an exercise program, in terms of desired health benefits, drive the exercise prescription because different types of exercise programs result in different outcomes. For example, aerobic exercise promotes cardiorespiratory fitness by using the large muscle groups in a continuous, rhythmic fashion (American College of Sports Medicine, 1998). Strength training using progressive resistance builds muscle mass and enhances muscle strength and endurance in the specific areas of the body being trained (Kraemer et al., 2002). Whereas aerobic exercise more effectively improves cardiorespiratory conditioning, strength training is more effective for minimizing skeletal muscle wasting associated with prolonged physical inactivity.

Improves Quality of Life

All healthcare providers strive to improve the QOL of the people they serve. Improving QOL is particularly salient for nurses, given their holistic approach to providing patient care. One of the first steps to understanding the connection between QOL and exercise is to understand what is meant by QOL. QOL has been defined in a variety of ways in the healthcare literature, although no one definition is accepted universally. A frequently cited definition of QOL is "a state of well-being that is a composite of two components: (1) the ability to perform everyday activities that reflect physical, psychological, and social well-being and (2) patient satisfaction with levels of functioning and the control of disease and/or treatment-related symptoms" (Gotay, Korn, McCabe, Moore, & Cheson, 1992, p. 576). The definition reflects several areas of theoretical agreement in defining QOL (Donovan, Sanson-Fisher, & Redman, 1989; Gill & Feinstein, 1994; King et al., 1997). First, an individualistic perspective is a central tenet of most QOL definitions, which means that individuals are the most suitable judges of their QOL. Second, QOL includes all aspects of people's lives, illustrating the multidimensional nature of the concept. Commonly included dimensions consist of physical, psychological, social, economic, and spiritual aspects of life.

Although most definitions incorporate the individualistic perspective and multidimensional nature of the concept, the focus or overall conceptualization of QOL may differ (Ferrans, 1990; Hacker, 2003). For instance, some definitions focus on individuals' perceptions of their health status, whereas other definitions focus on individuals' levels of satisfaction with their health status. Health status perceptions generally refer to individuals' evaluation of their health states; the underlying assumption being that normal health is the preferential state (Ferrans). Assessing QOL from a life satisfaction perspective reflects patients' cognitive appraisal of life's conditions (Ferrans). In this scenario, patients may realize that their health is not perfect yet still express satisfaction with life. Changes in health status perceptions, such as symptoms and functioning, may or may not correspond to changes in life satisfaction (Gupta, Lis, & Grutsch, 2007; Hacker & Ferrans, 2003; Hacker et al., 2006). Therefore, assessing QOL from health status and life satisfaction perspectives when evaluating an exercise intervention in people with cancer is imperative.

The relationships among symptomatology, functioning, health status perceptions, and life satisfaction are complex, with individual and environmental factors influencing expectations. People with cancer are told by their healthcare providers to expect changes in their health status as a result of the disease or its treatments. People also frequently are given a time frame to expect the changes. For example, patients receiving hematopoietic stem cell transplantation are informed to expect to experience some fatigue in the immediate period after transplantation. Problems with QOL, however, may arise when reality and expectations differ substantially. Consider a patient who has undergone a hematopoietic stem cell transplantation beginning an exercise intervention after discharge from the hospital. Following intensive cancer therapy, the patient expects to feel fatigued and may concurrently decrease his physical activity levels. However, the patient expects that recovery will be hastened by participating in an exercise program. If the patient recovers faster than he expected, improvements in life satisfaction may follow. If slower,

then the patient may report declines in life satisfaction. Recent literature supports that notion and suggests that a lag time exists between experiencing actual changes in health status and assimilating those changes into an appraisal of QOL (Hacker & Ferrans, 2003).

The Revised Wilson and Cleary Model for Health-Related Quality of Life provides a conceptual framework for approaching QOL assessment (Ferrans, Zerwic, Wilbur, & Larson, 2005; Wilson & Cleary, 1995) (see Figure 1). The model is particularly useful for clarifying various health outcomes that have been used to measure QOL, including those associated with exercise. The Revised Wilson and Cleary Model for Health-Related Quality of Life proposes the dominant, causal relationships between traditional, biologic, and physiologic variables and health-related QOL. The five types of outcomes included in the model are biologic function, symptoms, functional status, general health perceptions, and overall QOL. The patient health outcomes range along a continuum, with the biologic and physiologic outcomes anchoring one end of the continuum and the more complex and integrated measures of patient outcomes, such as QOL, anchoring the other end. Symptoms, functional status, general health perceptions, and QOL all have been used to represent QOL outcomes following an exercise program in people with cancer, illustrating the need for clarity regarding QOL.

Although an extensive review of all patient health outcomes associated with exercise is beyond the scope of this article, providing examples within each of the Wilson and Cleary categories can further illustrate the usefulness of the model. Clarity about how each aspect of the model relates to QOL and exercise is needed to advance the science. *Outcome measures of biologic function* is a term that refers to the assessment of cell function, organ function, and organ system function. Examples of biologic function that may be assessed following an exercise program include blood pressure, heart rate, maximal oxygen consumption, and immune function. *Outcome measures of symptoms* refers to the subjective experience and cognitive evaluation of people as a whole to changes in biologic function. Fatigue, pain, and dyspnea are examples of symptoms commonly assessed to evaluate the effectiveness of an exercise program. *Outcome measures of functional status* assess individuals' ability to objectively perform functional tasks. A primary goal of exercise is to improve functional status; therefore, most exercise programs include functional tests to determine the effectiveness of the program. Examples of functional outcomes include tests of muscle strength, ability to climb stairs, and distance covered during a six-minute walk. *General health perceptions* refer to individuals' evaluation of functional ability or health status. Examples that may be associated with exercise include perceived ability to climb stairs, perceived physical functioning, and perceived ability to function in defined roles. *Overall QOL outcomes* refers to individuals' cognitive judgment of well-being and life satisfaction. Life satisfaction or satisfaction with health and functioning are examples of overall QOL outcomes that can be measured in conjunction with an exercise program.

People With Cancer

Like *exercise* and *QOL*, the term *people with cancer* at first glance seems simple, yet it represents a wide range of meanings. More than 10 million Americans alive today have been diagnosed with cancer at least once during their lives (Ries et al., 2008). Would all these people fit into the category *people with cancer*? Unfortunately, the answer is unclear. *People with cancer* may include people with active disease; people with active disease receiving treatment; people without clinical evidence of active disease who are receiving adjuvant therapy; people with advanced disease receiving palliative care; people with advanced disease at the end of life; people who have survived cancer for 1, 3, or 12 months; and people who have survived cancer for many years. Although the term *people with cancer* clearly includes people with active disease or people undergoing treatment to prevent a relapse or recurrence, whether it should include people who are long-term survivors seems less clear, particularly if the long-term survivors more closely resemble the normal population than they

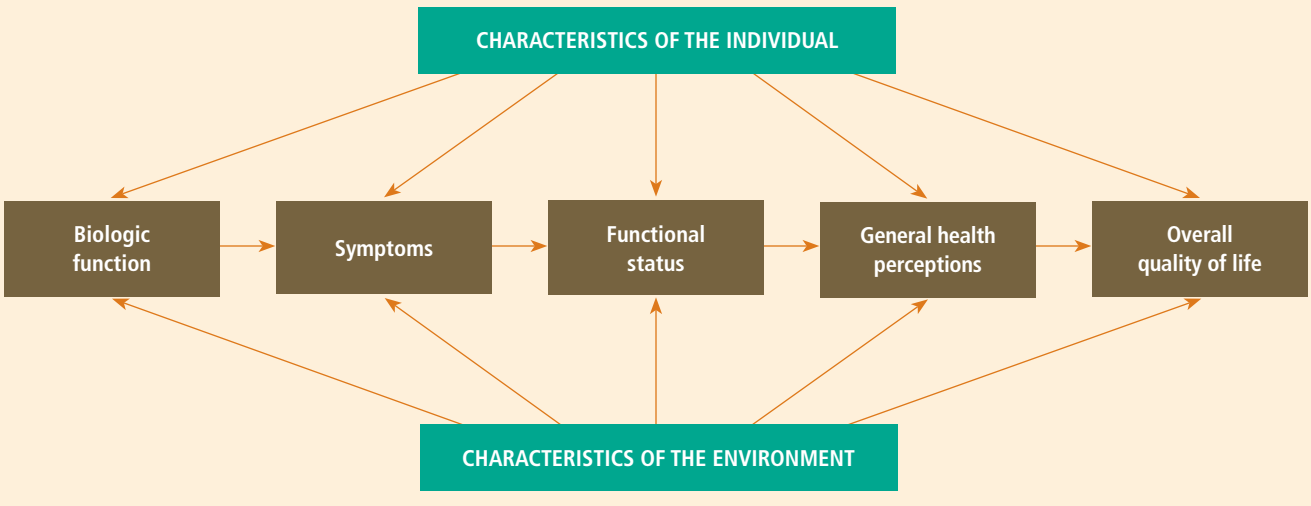

Figure 1. Revised Wilson and Cleary Model for Health-Related Quality of Life

Note. From "Conceptual Model of Health-Related Quality of Life," by C.E. Ferrans, J.J. Zerwic, J.E. Wilbur, & J.L. Larson, 2005, *Journal of Nursing Scholarship, 37*(4), p. 338. Copyright 2005 by Blackwell Publishing Ltd. Reprinted with permission.

resemble people with active cancer. Finding a way to distinguish the subcategories of people is particularly valuable when considering the impact of exercise on QOL outcomes.

The Ecological Framework for the University of Illinois at Chicago Cancer Nursing Research helps to delineate the various stages of cancer so that the connections between exercise and QOL can be examined (see Figure 2). The middle triangle defines the cancer trajectory from prevention to diagnosis, through survivorship or the end of life. The top boxes of the model signify the influence that personal and environmental factors have on the cancer experience, whereas the bottom boxes characterize potential patient outcomes (biologic, experiential, and behavioral). The model is particularly useful because QOL outcomes for an exercise program in long-term cancer survivors may not be generalizable or even feasible in people actively receiving cancer treatment. Furthermore, exercise programs designed for long-term survivors may require extensive modifications for people with active disease to participate. Given the complexities associated with exercise, QOL, and people with cancer, a great deal of attention needs to be paid to developing, implementing, and evaluating an exercise program in people with cancer.

Designing an Exercise Program for People With Cancer

Multiple exercise programs can be found to meet a wide range of healthcare needs simply by searching the Internet. Deciding on the best approach for people with cancer, however, requires detailed knowledge of the specific cancer, cancer treatment, and expected recovery patterns to address the potentially changing needs of the target group. Unfortunately, a cookbook approach for designing an exercise program for use in all people with cancer does not exist. Although extensive research investigating various exercise interventions has been conducted or currently is under way, questions addressing the best type of exercise for various cancer subpopulations have not been resolved.

Goals

One of the first steps to designing a successful exercise program is to clearly define the goals so that the specific needs of the cancer population can be met. In the normal, healthy population, exercise goals are directed at improving cardiorespiratory fitness, muscular strength, flexibility, and body composition. In people with cancer, the goals may be more explicitly defined, such as facilitating recovering from cancer by restoring physical function, alleviating symptoms, assisting people to adapt to a new level of wellness, and improving QOL. Because a wide range of potential health states exist across the cancer experience, the needs of the target group must be defined clearly so that appropriate goals can be formulated. For instance, the needs of people with lung cancer recovering from a surgical excision may be vastly different from the needs of long-term survivors of breast cancer; the goals of each program should reflect such nuances. In addition to developing overall goals, identifying specific goals for each patient that take into account his or her current physical abilities, past experience with exercise, and comorbid conditions is important for tailoring the exercise program.

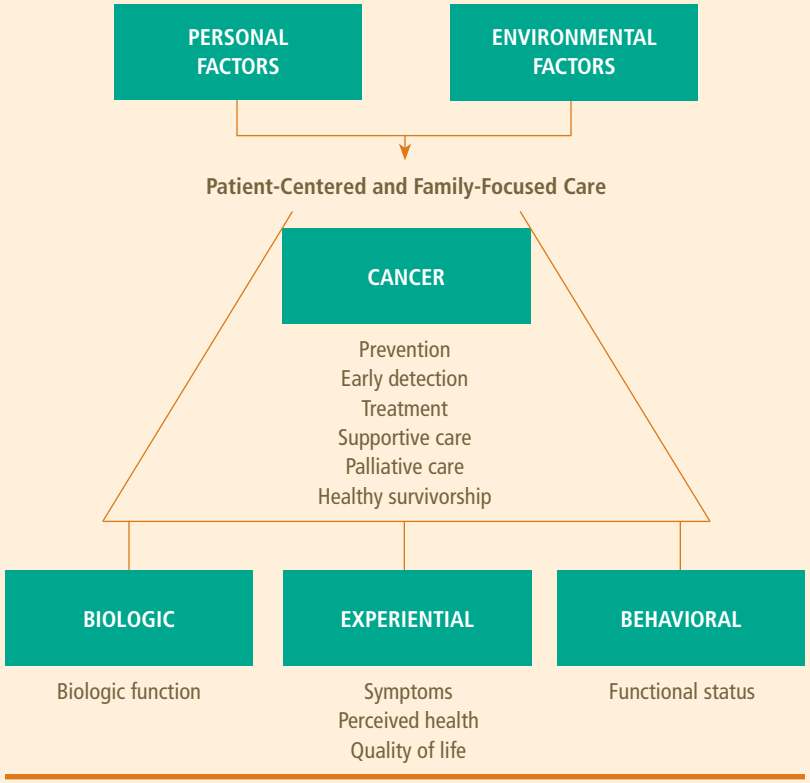

Figure 2. Ecological Framework for the University of Illinois at Chicago Cancer Nursing Research

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Exercise Prescriptions

The stated goals of the exercise program and unique needs of the target cancer population guide the development of the exercise prescription. The five major components of exercise prescriptions are mode, intensity, duration, frequency, and progression of exercise (Whaley et al., 2006). Mode refers to the type of exercise that is performed. Intensity refers to the body's work output during an exercise session. Duration refers to the amount of time or number of sets prescribed during an exercise session. Frequency refers to the number of days per week to include exercise sessions, and exercise progression refers to the optimal level of stress or physical overload that should be achieved over time (e.g., when to increase weights or repetitions for strength training, when to increase time spent in moderate- or vigorous-intensity activity for aerobic exercises). In addition to general exercise principles, other factors to consider include the availability of physical and human resources. For instance, will participants be supervised in a health fitness or healthcare facility or unsupervised in the home setting?

Multiple guidelines exist for prescribing exercise for healthy people and those with chronic illnesses (American College of Sports Medicine, 1998; Kraemer et al., 2002; Skinner, 2005). Since 1982, the American College of Sports Medicine has developed a number of position stands on various aspects of exercise.[1] The guidelines developed by the Centers for Disease Control and Prevention ([CDC], 2008) are among the most frequently cited. The CDC recommends a minimum of 30 minutes per day of moderate-intensity physical activity on most days of the week or 20 minutes of vigorous-intensity activity three days per week for adults to promote cardiorespiratory fitness. In addition, the recommendations include strength training exercises consisting of 6–8 exercises with 8–12 repetitions for each exercise to maintain or build muscular strength.

Developing an exercise program for people with cancer introduces distinct challenges. A wide range of aerobic activities exist, such as indoor or outdoor walking, treadmill walking, cycling, running, swimming, and dancing. Although all of these activities have been implemented successfully in people with cancer, participation in some of them may be contraindicated in subgroups of people with cancer (Coleman, Coon, et al., 2003; Courneya, Friedenreich, et al., 2003; Dimeo, Thomas, Raabe-Menssen, Propper, & Mathias, 2004; Fairey et al., 2003; Kolden et al., 2002; Mock et al., 1997, 2001; Pickett et al., 2002). For example, people with laryngectomies will not be able to swim given the likelihood of aspiration and possible drowning. People who are neutropenic will not be able to go to a gym to participate in an aerobic dance class because of the risk of infection.

Similar challenges exist for designing strength training programs for people with cancer. Multiple studies demonstrate the effectiveness of strength training interventions in building muscle strength and enhancing endurance in people with cancer (Cunningham et al., 1986; Ott et al., 2004; Segal et al., 2003; Sprod, Drum, Bentz, Carter, & Schneider, 2005). Like aerobic activities, different methods may be used, such as free weights, specialized machines, elastic resistance bands, or walking poles. A one-size-fits-all approach, however, is not practical. For instance, in a current study being conducted by the author and colleagues of people who underwent hematopoietic stem cell transplantations, elastic resistance bands for strength training were used instead of free weights. The decision was influenced by the need for each patient to have his or her own set of weight training devices to reduce the risk of infection. Other factors included portability of the bands, ease of use, and unlikelihood of causing serious injury if inadvertently dropped. Using elastic resistance bands gives people the opportunity to participate in strength training sessions during a clinic visit without the need for expensive weight training machines or heavy weights. Although designing an exercise program for people with cancer is not simple, most challenges can be overcome with good planning, adequate resources, and creativity. Whether the program is designed for use in a clinical or research setting, collaboration among oncology healthcare providers, researchers, and exercise specialists is key.

[1] The position stands can be accessed at www.acsm-msse.org/pt/re/msse/positionstandards.htm.

Implementing Exercise in People With Cancer

Exercise Testing

One of the most efficient ways to avoid pitfalls associated with starting a new exercise program in people with cancer is to design a program that is acceptable and feasible and meets the needs of the target population. Exercise testing to establish people's tolerance to exercise and ability to advance the exercise prescription is a vital component of any exercise program. The results from exercise testing determine the initial exercise prescription; periodic exercise testing following implementation determines the progression of exercise. Exercise testing generally consists of a battery of tests, such as health and functioning questionnaires, health history and physical examination, laboratory tests, body composition, functional field tests, aerobic capacity, and muscular strength. The American College of Sports Medicine's Guidelines for Exercise Testing and Prescription are an excellent resource for healthcare providers involved in testing (Whaley et al., 2006). The exercise test battery is influenced heavily by the goals, mode, and intensity of the planned program. For instance, the exercise test battery for programs promoting cardiorespiratory fitness via vigorous-intensity aerobic exercise may be different than the test battery for low-intensity strength training. In people with cancer, the exercise test battery may be further influenced by cancer and its treatments. Although most people with cancer can safely perform many of the exercise tests, performing maximal exercise testing may not be feasible in people with metastatic disease, people with advanced disease, or people experiencing the acute side effects of cancer treatment (Skinner, 2005). Ensuring the safety of people with cancer during exercise testing and exercise sessions is the leading priority for all healthcare providers.

Although designing an exercise program for people with cancer is not simple, most challenges can be overcome with good planning, adequate resources, and creativity.

Adherence

Adherence to exercise, defined as the extent to which individuals' exercise behaviors correspond with the exercise prescription, remains one of the most complex problems to address for clinicians and researchers interested in implementing exercise programs. Adhering to an exercise program is difficult for healthy people; a cancer diagnosis may complicate matters further. In people with cancer, difficulty adhering to an exercise program may be related to the cancer, cancer treatment, potential short- and long-term effects of the treatment, time since treatment, and comorbid conditions. For example, feeling sick or fatigued, losing interest, and experiencing nausea and vomiting were the most frequently cited reasons for missing an exercise session in a study of women with breast cancer receiving adjuvant treatment (Courneya et al., 2008). Other factors not specifically related to cancer also may influence exercise

behaviors in people with cancer, such as desire to exercise, time to exercise, and belief in the ability to exercise (Blanchard, Courneya, Rodgers, & Murnaghan, 2002; Courneya, Blanchard, & Laing, 2001; Courneya & Friedenreich, 1997; Ott et al., 2004). Following a cancer diagnosis, some people report exercising less even though they have made other healthy behavioral changes, illustrating the difficulty associated with exercise adherence (Blanchard et al., 2003).

Monitoring adherence to a recommended exercise prescription is an important component of implementation because the potential benefits of exercise in a research or clinical setting cannot be achieved without actually doing the work. Adherence rates vary, although many studies do not report adherence rates. The method of reporting adherence rates obscures matters further as adherence may be conveyed as the mean attendance at exercise sessions or mean number of minutes spent exercising. Attendance and time spent exercising do not convey the same information because participants may attend every session but not achieve their exercise goals. For instance, in a study involving women previously treated for breast cancer, 77% attended 70% of the exercise sessions; however, many women were not able to achieve their exercise goal of 30 minutes of aerobic activity (Daley, Crank, Mutrie, Saxton, & Coleman, 2007). Monitoring exercise adherence becomes particularly salient in a research setting because adherence rates have a direct effect on the findings and future translation to clinical practice. Positive exercise research findings from high-quality studies are more likely to be implemented in a clinical setting if high adherence rates were demonstrated. Conversely, studies with low adherence rates, even if the findings were positive, may be less likely to be implemented in clinical practice if the exercise intervention is deemed too demanding for the target population or staff.

Because several factors influence exercise adherence, a multipronged approach for increasing compliance is frequently needed. In a clinical setting, choosing an exercise routine that is enjoyable, working with a buddy, setting realistic goals, building exercise into daily routines, varying the exercise routine, and using social support networks may be helpful for enhancing exercise adherence. Setting unrealistic goals or "overdoing it," especially during the initial phases of exercise adoption, are common mistakes. In people with cancer, the ability to adhere to different levels of exercise intensity may vary depending on the status of the disease. For instance, people with cancer actively undergoing treatment may be less likely to adhere or even begin a high-intensity program, especially if significant side effects from chemotherapy are expected. A lower-intensity program that is home-based, such as walking, may be preferred, as was the case in a group of women with breast cancer receiving adjuvant treatment (Rogers, Courneya, Shah, Dunnington, & Hopkins-Price, 2007). A number of potential strategies to enhance exercise adherence have been documented in the cancer research literature, including keeping weekly phone contacts (Courneya et al., 2005; Windsor, Nicol, & Potter, 2004), providing positive reinforcement (Pinto, Frierson, Rabin, Trunzo, & Marcus, 2005), keeping weekly journals (Coleman, Hall-Barrow, Coon, & Stewart, 2003), and assisting people with the identification of barriers to exercise (Pinto et al.).

Evaluating the Impact of Exercise on Quality of Life

The single most important aspect of evaluating the impact of exercise on QOL in people with cancer is to promote the safety, health, and well-being of people while minimizing the potential risks associated with exercise. Multiple integrative reviews and meta-analyses have been published and the data synthesized to identify gaps in knowledge, present the evidence base for practice, and provide suggestions for future research (Courneya, 2001, 2003; Galvao & Newton, 2005; Knobf, Musanti, & Dorward, 2007; Knols et al., 2005; McTiernan, 2003; Pinto & Floyd, 2007; Stevinson et al., 2004; Young-McCaughan & Arzola, 2007). Although all of those reviews firmly establish the benefits of exercise in people across the cancer trajectory, questions still remain about the type of exercise that is best for achieving specific outcomes in various subgroups. Clearly articulating the scope of the exercise intervention, including information about exercise testing, the

Biologic Function
- Oxygen use
- Energy expenditure
- Body composition
- Body fat
- Immune function
- Lean body weight
- Heart rate
- Blood pressure

Symptoms
- Fatigue
- Vigor
- Psychological distress
- Anxiety
- Depression
- Sleep disturbances

Functional Status
- Number of steps walked per day
- Distance walked per day
- Time spent in moderate or vigorous physical activity
- Time needed to climb stairs
- Hand-grip strength
- Muscular strength
- Distance covered during a six-minute walk
- Aerobic capacity
- Time needed to get out of bed

General Health Perceptions
- Perception of global health
- Perception of physical functioning
- Perception of role functioning
- Perception of emotional functioning
- Perception of cognitive functioning
- Perception of social functioning

Overall Quality of Life
- Improved life satisfaction
- Improved satisfaction with health

Figure 3. Commonly Assessed Patient Health Outcomes Associated With Quality of Life

Note. Based on information from Ferrans et al., 2005; Wilson & Cleary, 1995.

nature of the intervention, exercise adherence, and evaluative methods will help to advance the science and, more importantly, improve the care of people with cancer. Figure 3 lists examples of some commonly assessed patient health outcomes associated with QOL that may be used to evaluate the efficacy of an exercise program.

Conclusions

Oncology nurses are concerned with improving overall QOL of people and play a critical role related to encouraging regular exercise and physical activity. Understanding the various contexts in which the terms *exercise*, *QOL*, and *people with cancer* are used is paramount for translating exercise research into practice. Aerobic exercise promotes cardiorespiratory fitness, and strength training builds muscle strength and adherence. A one-size-fits-all approach for prescribing exercises in people with cancer is not practical as needs vary across disease groups and the cancer trajectory. Multiple issues specifically related to cancer and the treatment of cancer impact the development, implementation, and evaluation of exercise programs. Exercise research to improve QOL in people with cancer is becoming more sophisticated as researchers attempt to address the needs of various groups of people with cancer. Ongoing investigations with subsequent translations into clinical practice will further strengthen the connections between exercise and QOL in people with cancer. Effective collaboration across healthcare disciplines, such as oncology nursing, medicine, physical therapy, and exercise specialists, is the key to ensuring the safety of people with cancer beginning an exercise program.

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Journal Club Discussion Questions

This article has been selected for the journal club, a new feature for the *Clinical Journal of Oncology Nursing*. An accompanying Evidence-Based Practice column (pp. 109–112) discusses how to implement and participate in journal clubs. When you read this article, think about how you would change your current practice regarding exercise. Photocopying of this article for discussion purposes is permitted.

1. What are the current exercise recommendations for healthy adults?
2. How should these recommendations be adapted for patients with cancer?
3. How do we assess for activity level with our patients?
4. What do we recommend for exercise for our patients?
5. What strategies should we consider for our patient population?