Synergy Between Licensed Rehabilitation Professionals and Clinical Exercise Physiologists: Optimizing Patient Care for Cancer Rehabilitation

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Abstract

Objectives: To differentiate between rehabilitation and exercise training and propose how rehabilitation professionals and exercise physiologists can collaborate to optimize cancer survivor care.

Data Sources Professional organizations and peer-reviewed manuscripts.

Conclusion: Both professions offer complementary skillsets that, when integrated, optimize the ability of the cancer care team to implement more effective survivorship care-plans. Future models of care must incorporate efficient communications between the cancer rehabilitation program and oncology team, include various reimbursement/payment/funding options, and continuously assess program efficacy.

Implications for Nursing Practice: Nurses must be cognizant of physical needs (i.e. functional and conditioning status) and cancer-related comorbidities when referring cancer survivors for exercise-reconditioning.

Keywords: Exercise, Rehabilitation, Cancer, Exercise Physiologist, Physical Therapy

Introduction

Over the past two decades a substantial amount of data has accumulated that strongly suggests participation in some form of regular exercise can improve the physiological and psychological status of cancer survivors at all points along the cancer continuum[1]. Specifically, engagement in regular exercise before being diagnosed with cancer is inversely associated with cancer incidence[2,3] and cancer-specific mortality[2,4-7], thus providing protection against the 2nd leading cause of death in the United States[8]. Such protection appears to be dependent on exercise intensity, with a one-unit increase in metabolic equivalents, a method of quantifying relative exercise intensity[9], being associated with a 4% reduction in cancer incidence (HR 0.96, 95%CI 0.95, 0.98)[3]. Cancer survivors, defined as anyone having received a cancer diagnosis[10], can derive a multitude of health benefits from participating in exercise training programs after diagnosis, during active treatment, and following completion of treatment[1]. Even patients in palliative care can improve their physical functioning capacity and quality of life by participating in exercise training programs[11].

While cancer survivors can positively adapt to exercise training, their medical status, secondary to their disease and/or its treatment, varies widely across the cancer continuum and can play a significant role in determining the safest and most efficacious exercise training program. By extension, their medical status can also help determine who is the best qualified professional to supervise their participation in exercise training programs. For cancer survivors in need of general conditioning, with no concerning impairments or comorbidities, individuals with limited specialized training can provide supervision or the survivor him/herself can self-direct an exercise program[12]. In contrast, survivors in need of both rehabilitation and reconditioning services secondary to greater medical acuity and complexity, will most likely require healthcare providers with more specialized clinical training to provide an exercise program that is safe and efficacious. Two professional groups are generally considered when referring cancer survivors to an exercise program, exercise physiologists and rehabilitation

professionals. These groups differ in the level of their training, licensure and skill sets making it essential that the survivor is carefully matched to the most appropriate exercise professional.

The purpose of this manuscript is to define the role and responsibilities each of these professionals have in providing exercise based services to the cancer survivor and explore how members of each group can successfully and safely contribute to the care of cancer survivors using exercise based interventions. We aim to demonstrate this by first, describing the differences between licensed rehabilitation professionals and exercise physiologists in terms of the services that each group can provide and secondly, suggesting when each group can safely and most effectively contribute to providing exercise services to the cancer survivor. Finally, we suggest that both groups have a role to play in reconditioning cancer survivors and therefore will present different types of health-care models that have potential for integrating rehabilitation and exercise training professionals into cancer care. This information is provided in an effort to assist nurses in making appropriate referrals for patients with physical and functional deficits secondary to a cancer diagnosis.

The Difference Between Licensed Rehabilitation Professionals and Exercise Physiologists

Rehabilitation vs. Exercise Physiology

Before differentiating between rehabilitation professionals and exercise physiologists, it is important to define the differences between rehabilitation, in the context of providing exercise training programs, and exercise training. In this context, rehabilitation programs utilize exercise interventions, with the intent of optimizing physical function deficit and in many cases conditioning status as well[13-15]. In contrast, exercise training programs utilize exercises aimed primarily to improve an individual's physical conditioning status, specifically improving cardiorespiratory fitness, muscular strength and flexibility[16]. Considering this difference between rehabilitation and exercise training, table 1 contrasts rehabilitation and exercise physiology professionals in several aspects including the general focus of each field, the focus of each field

in the context of cancer, the setting where each profession is practiced, and the outcome goals of each profession.

Workforce- Licensed Rehabilitation Professionals

Two groups of licensed rehabilitation professionals are generally recognized as being the most competent at treating cancer survivors with physical functional and/or conditioning deficits, physiatrists, and physical and occupational therapists. Physiatrists are physicians whose primary tasks include diagnosing and leading treatment and/or prevention plans focused on improving physical function; prescribing prosthetics/orthotics and assistive equipment, providing cognitive therapy, medications, injections, and therapeutic exercise; and leading a team of physical therapists, occupational therapists, nurse practitioners and/or physician assistants in delivering patient treatment plans; and documenting encounters with patients and patient progress[17]. The second group consists of physical and occupational therapists. The primary tasks of physical therapists include diagnosing functional and conditioning limitations and associated medical issues, developing treatment plans to restore or manage these limitations, educating patients about both their medical issues that are associated with their functional deficits and exercises needed to manage these functional and conditioning limitations, educating patients about the use of assistive equipment if necessary such as a walker or cane, and documenting both encounters with patients and patient progress[18]. The primary tasks of occupational therapists include identifying patient goals related to activities of daily living, developing treatment plans relevant to these goals, and documenting both encounters with patients and patient progress[19].

All of these professionals' work in inpatient/outpatient settings, medical offices (i.e. individual private practice or group private practice), rehabilitation centers, or education and research centers. Physiatrists and physical/occupational therapists may also work with hospice care, skilled nursing or extended care, and sub-acute care facilities[17,20]. Additionally, physical therapists may also work in workplace/industrial environments, fitness centers and sports

training facilities[18]. Unique to occupational therapists, evaluations may also be conducted in a patient's home or other environment most comfortable or relevant to the patient's goals[19].

Training within each profession varies significantly. Physiatrists are medical doctors. Upon successful completion of medical school, an individual must complete a four-year residency program in physiatry[17]. The first year consists of general clinical training, consistent with residency programs of other specialties, then years 2-4 consist of general inpatient and outpatient rehabilitation[17]. Examples of areas within general inpatient rehabilitation training include cancer, severe deconditioning, stroke, spinal cord injury, traumatic brain injury, neoplastic or ischemic brain injury, and pediatrics, specifically cerebral palsy, spina-bifida, trauma, muscular dystrophy[17]. Examples of areas within outpatient rehabilitation training include cancer rehabilitation, cardiopulmonary rehabilitation, geriatrics, amputee, wound care, musculoskeletal clinic, and pediatrics[17]. Upon completion of residency, an individual may choose to specialize in brain injury medicine, pain medicine, spinal cord injury medicine, hospice and palliative care medicine, neuromuscular medicine, pediatric rehabilitation medicine, or sports medicine[17]. State licensure to practice is also required of physiatrists, since they are physicians.

All physical therapy training programs in the USA offer a clinical doctoral degree in physical therapy (DPT), which includes hours of supervised clinical training and didactic instruction. Upon successful completion of a DPT degree program, an individual is eligible to sit for a licensure examination which is overseen by The Federation of State Boards of Physical Therapy. Scores on this examination are used by state physical therapy licensing boards to issue a license which allows a physical therapist to practice in that state[9]. Currently, several state licensure boards (n=25) recognize a license issued by another state as meeting licensure requirements in that state under a program referred to as the Physical Therapy Licensure Compact[20]. Additionally, physical therapists with advanced skills and knowledge in oncology rehabilitation are designated as "Specialist in Oncology Physical Therapy" by the American

Physical Therapy Association. This designation requires completing a fixed number of clinical hours in an oncology setting and passing a written examination. Physical therapy services may also be provided by physical therapist assistants. Physical therapist assistants and technicians are licensed health care providers who can provide patient care but must be directly supervised by a licensed physical therapist.

Regarding occupational therapy, successful completion of a Bachelor of Science degree in occupational therapy or related field, such as kinesiology, biology, psychology, or sociology, and a Master of Science degree or a doctorate degree in occupational therapy permits an individual to sit for the national licensure examination. Successfully passing this examination allows an individual to obtain a license to practice occupational therapy from the National Board Certification of Occupational Therapy[19]. As with physical therapy, occupational therapy services can be provided by occupational therapist assistants. Occupational therapist assistants must work under the direct supervision of an occupational therapist and the assistant must have completed a relevant academic program and be licensed.

Workforce- Exercise Physiologists

While licensed rehabilitation professionals often focus on improving functional deficits and physical deconditioning, exercise physiologists focus on improving fitness or physical deconditioning. The primary tasks of exercise physiologists include: a) conducting diagnostic exercise tests, such as testing cardiorespiratory fitness, muscular strength endurance, power, and flexibility; b) designing exercise prescription, c) developing a safe, evidence-based, individualized exercise program aimed at meeting a patient's needs (based on exercise testing and personal goals), d) increasing engagement in regular exercise, e) providing exercise instruction and supervision, and f) periodically reassessing exercise program efficacy. Similar to licensed rehabilitation professionals, exercise physiologists may work in outpatient hospital settings, notably cardiac rehabilitation programs, private practices, and education and research centers. Exercise physiologists may also work in community wellness centers, fitness centers

(including but not limited to the YMCA), and/or work as a personal trainer or owner of a gym or fitness studio.

Requisite training to become an exercise physiologist includes earning a Bachelor of Science degree in exercise physiology, kinesiology, or related field such as biology which includes practicum hours. Earning a Master of Science degree in exercise physiology, kinesiology, or related field is often strongly encouraged. Upon successful completion of the baccalaureate degree program, one is eligible to sit for certification examinations to become a recognized, certified exercise physiologist from several organizations but most significantly from the American College of Sports Medicine (ACSM)[21]. Certifications from the ACSM are the gold standard in the field. In addition to this certification, the ACSM also offers the following specialty certifications: clinical exercise physiologist, personal trainer, group exercise instructor, cancer exercise trainer, Exercise Is Medicine™, inclusive fitness trainer, and physical activity in public health specialist[21]. Each certification has slightly different eligibility criteria, which are outlined on the ACSM website[21]. For example, in order to obtain the clinical exercise physiologist certification, an individual must have completed either a baccalaureate degree in exercise physiology or related field and 1,200 hours of documented, hands-on clinical experience, or a Master's degree in clinical exercise physiology or related field and 600 hours of hands-on clinical experience[21].

Relevant to cancer care, the ACSM certifies individuals as being a Cancer Exercise Trainer. Receipt of this certification requires the applicant to have a baccalaureate degree in any related field, an ACSM exercise physiologist certification, CPR/AED certification, at least 500 hours of hands-on experience training older adults or populations with chronic disease (any chronic disease) and to have passed a written certification examination. In lieu of the degree requirement, an applicant can sit for the certification examination if they have completed at least 10,000 hours of hands-on experience training the aforementioned populations[21]. This certification is currently undergoing revision and the updated version will be available in spring

2020. Other groups such as the Livestrong Foundation, the American Academy of Health and Fitness, and American Council on Exercise offer certificates in cancer specific exercise therapies, however certifications offered by the America College of Sports Medicine remain the gold standard of certifying specialists in exercise physiology.

It is important to note that while some exercise physiologists are fitness trainers, as mentioned above, not all fitness trainers have educational background and training in exercise physiology or kinesiology. This is why it is critical for an individual (i.e. patient or referring health care professional) to pay attention to the exercise professional's certifications. Alfano and colleagues[12] recently presented a "stepped-care framework" to help with referring patients to health care professionals based on rehabilitation needs and underlying conditions secondary to cancer treatment. Considering these criteria, this model suggests that it is quite reasonable to have fitness trainers, not exercise physiologists, provide an exercise program designed to reduce physical deconditioning in cancer survivors who do not have cancer-specific morbidities[12]. Effective types of programs for this type of scenario are community-based programs, such as the LIVESTRONG at the YMCA. The LIVESTRONG program is a free, 12-week, group-based exercise program for cancer survivors[22]. The program is led by fitness trainers who are required to complete the following: one-hour online course about cancer survivorship, one-hour lymphedema webinar, and a 16-hour program-specific instructor training[22].

Health Care Models with Potential to Integrate Rehabilitation and Exercise Training in Cancer Care

Nursing staff are often in a position to decide whether to refer patients to rehabilitation professionals versus exercise physiologists. This decision should be driven by the patient's needs and medical status[23]. Licensed rehabilitation professionals provide services to patients with greater acuity and/or specific functional deficits. Rehabilitation professionals are impairment driven. When there is a specific impairment to address, rehabilitation professionals should be

the first referral nurses make. In contrast, exercise physiologists provide services to patients where physical deconditioning is the essential rehabilitation need. Considering some cancer patients may require services from both professions within their course of cancer care, health care models integrating the two are most advantageous and should be the model employed under the umbrella of cancer rehabilitation. Recently, a statement regarding a national initiative in cancer rehabilitation was produced by experts from the Rehabilitation Medicine Department of the Clinical Center at the National Institutes of Health, National Cancer Institute, and the National Center for Medical Rehabilitation Research[24]. Within this statement, the following existing rehabilitation models were reviewed for potential to serve as cancer rehabilitation models: post-acute care, home care, and outpatient ambulatory care. Table 2 provides details of the setting of each existing rehabilitation model, services offered, and challenges as presented in the expert group statement[24]. Along with identifying existing rehabilitation models that could serve as cancer rehabilitation models, it is important to also address the collective challenge of the model in the context of cancer care and consider utilizing existing cardiac rehabilitation models as an alternative approach to providing reconditioning services[25,26].

Collective Challenges with Existing Rehabilitation Models

Missing from the aforementioned rehabilitation models are calls for consistent communications between the rehabilitation team and the oncology team, leading to poor integration and implementation of the oncology care plan, and a reduced ability to address the needs exclusive to cancer survivors within services offered[24]. Communication and consideration of the needs of the cancer survivors are critical in optimizing treatment outcomes and survivorship. At the end of the report, the expert panel provides key recommendations for future cancer rehabilitation programs to consider[24].

In addition to findings and recommendations from the expert panel, involvement of an exercise physiologist is often missing from existing oncology rehabilitation models. Involvement of these professionals is a necessary next step in the continuum of rehabilitation care. In line

with helping patients improve function, mobility, and ability to competently complete activities of daily living, it is critical to engage patients in regular exercise training in efforts to prevent further physical deconditioning, cancer recurrence (in some cases), and improve cardiorespiratory fitness and overall health. Furthermore, not all patients may need rehabilitation based services to improve their physical function, and the timely use of mechanisms to make this determination would allow for immediate referral to an exercise physiologist and offers numerous advantages. A prime example of how to integrate exercise physiologists into current oncology rehabilitation is described within Alfano and colleagues[12] proposedcancer rehabilitation stepped care model.

Utilization of Existing Cardiac Rehabilitation Programs

An alternative to the aforementioned models for cancer rehabilitation is utilizing existing cardiac rehabilitation programs to provide oncology rehabilitation[27]. Use of existing cardiac rehabilitation programs may be advantageous for the following reasons: exercise training is the central therapeutic intervention utilized, the staff consists of highly trained exercise physiologists and at some sites include rehabilitation professionals, and the infrastructure needed to support exercise training is in place. On the other hand, there are some challenges with using this model. First, referrals to such programs are extremely poor—less than 30% of eligible candidates for these programs actually enter these programs[28]. Secondly, rebranding and expanding the manner in which cardiac rehabilitation services have been identified will be essential for continued viability of these programs[29]. Finally, these programs will require additional training of current staff, regarding the skills needed to identify the non-exercise related deficits frequently found in cancer survivors[25], and/or hiring new staff with specific expertise in oncology. In all, effective use of existing cardiac rehabilitation programs would require both careful and ongoing integration of rehabilitation staff from cardiology and oncology services and cancer focused education of cardiac rehabilitation staff[26,30]. The American Heart Association has recently provided a strong endorsement of integrating oncology rehabilitation into the cardiac rehabilitation model[25].

An investigation by Hubbard and colleagues[31] assessed the feasibility and acceptability of referring colorectal cancer survivors post-resection (but may still be undergoing adjuvant therapy) to a cardiac rehabilitation program. No adverse events were reported in the 12-week program, suggesting that cardiac rehabilitation may be safe for colorectal cancer survivors[31]. A total of 62% of participants completed the program with the following reasons listed as the main barriers for dropping out of the program or not starting the program: musculoskeletal issues, need for additional surgery, mental health issues, uncontrolled hypertension, and adverse treatment-related side effects[31]. Qualitative data collected from participant interviews suggest that travel distance and recovery from treatments (i.e. abdominal surgery, chemotherapy, placement of a stoma) were the main barriers associated with attending sessions within the cardiac rehabilitation program. Significantly these participants perceived the cardiac rehabilitation program as increasing their confidence and motivation to exercise and the program offered peer-support[31]. In all, while there is some evidence to suggest the utility of the cardiac rehabilitation model for oncology rehabilitation, more research in this area is needed, especially with consideration to addressing the specific needs of cancer survivors within this model, as mentioned previously.

Health Care Models That Effectively Integrate Rehabilitation and Exercise Training in Cancer Care

To our knowledge, there are currently two health care models used for cancer rehabilitation that integrate rehabilitation and exercise training, the ActivOnco Model of Care[32] and the Community-Level Cancer Rehabilitation Program[33,34]. These models have successfully streamlined referrals within the clinical workflow to the cancer rehabilitation program. We briefly review the model details, efficacy and challenges.

ActivOnco Model of Care Details

The ActivOnco Model, also known as the Rehabilitation and Exercise Oncology Program, was established in 2008 by the Hope and Cope program at the Segal Cancer Center

in the Jewish General Hospital in Montreal, Quebec[32]. The aim of this cancer rehabilitation program is to transition patients from the hospital into the community. The director of the program is a physical therapist, and the program is carried out by four physical therapists, based in the hospital, and three exercise physiologists, based in the hospital's outpatient/community wellness center[32]. The model of the program consists of two pathways, "assessment for rehabilitation needs" and "screening for exercise eligibility"[32]. Briefly, within the "assessment for rehabilitation needs" pathway, based on an initial functional assessment carried out by a physical therapist in the hospital, patients may receive education, manual mobilizations, and/or referral for rehabilitation. The referral to rehabilitation may call for a single rehabilitation service or a combination of several rehabilitation services (i.e. physical therapy, occupational therapy, psychosocial support, etc.)[32]. This assessment may also lead to evaluation for coordination of special needs, such as paratransit services, mobility aids, and disabled parking permits[32]. Within the "screening for exercise eligibility" pathway, the ACSM guidelines for cancer survivors[35] is used both to guide exercise recommendations and identify the most appropriate exercise setting. For example, depending on the assessment and the individual's goals, the most appropriate setting for the exercise program may be an unsupervised setting, such as in the home or community fitness center, or a supervised exercise setting, such as in the hospital wellness center[32].

Patients with cancer, regardless of type, stage, and treatment plan or history, are eligible to participate in the program. Referrals to the program are made by the provider, health care team, hospital staff, or even self-referral[32]. Referrals are based on patient-reported criteria and/or clinically observed criteria. Examples of patient-reported criteria include significant reduction in activity level, increased fatigue, persistent shortness of breath, muscular weakness/steroid-induced myopathy, and loss of balance and/or coordination[32]. Examples of clinically derived criteria include the following: a) risk of falls, b) loss of mobility and/or need for ambulation aids, c) bone metastasis, d) avascular necrosis, e) risk of pathologic fracture, f)

extensive orthopedic stabilization procedures, g) osteopenia or osteoporosis, h) persistent peripheral neuropathies, i) fibrosis affecting range of motion, j) functional limitations post reconstructive surgery, k) at risk for lymphedema, l) weight gain or change in muscle mass secondary to hormone therapy (i.e. androgen deprivation therapy), m) preparation for stem-cell or bone marrow transplant, and n) based on pre-habilitation assessment before implementation of medical treatments[32].

Once a patient is referred, he/she completes an initial evaluation with a physical therapist in the hospital. The evaluation is tailored to cancer diagnosis, stage of disease, and the objective of the referral to the program[32]. Additionally, the evaluation includes a comprehensive review of the patient's medical history, treatment status, physical exam, and functional performance evaluation[32]. Upon completion of the evaluation, patients are divided into two categories, non-complex or complex. Non-complex patients were defined as follows: earlier stage cancer diagnosis, non-recurrent or non-metastatic disease, history of standard treatment protocols, without significant treatment-related side effects, and minimal rehabilitation needs[32]. Non-complex patients received relevant education from the physical therapy team upon completion of their evaluation and were then referred to the exercise physiologist team at the hospital's outpatient wellness center. Alternatively, complex patients were defined as having significant treatment-related side effects and/or with a history of extensive or reconstructive surgery that severely affects activities of daily living and physical capabilities[32]. Complex patients received referral for rehabilitation services in the hospital, with a plan for eventual referral to the exercise physiologist at the wellness center upon completion of rehabilitation. Complex patients may also be referred for coordination of assistive services such as disabled parking permits, paratransit services or mobility aids[32].

ActivOnco Model Efficacy & Challenges

The model was evaluated over a two-month period from June 1-July 31 2013[32]. Within this period, 75 new patients were seen and 159 patients had follow-up appointments. A total of

71% of referrals came from the health care team (i.e. nurse coordinators, dietitians, social workers), 35% came from the treating oncologist, 15% were self-referred, and 14% came from staff or volunteers from the hospital's psychological service unit[32]. A total of 52% of patients seen were on active treatment, with greater than 35% of patients with metastatic disease and 16% with bone metastasis[32]. Among those patients able to start exercise without rehabilitation referral, 55% were referred to the hospital's outpatient wellness center, 51% were referred for home-based exercise programs, and 2% were referred to local community-center exercise programs. Among the patients requiring rehabilitation before exercise, 2% required physical therapy and/or occupational therapy, 16% required services from a specialized clinic (i.e. lymphedema clinic), 3% required services from local community centers, 4% required services related to manual mobilizations, 1% required rehabilitation at a private practice, and 0.5% required an inpatient rehabilitation program and palliative care[32]. Additionally, during this evaluation period, physical activity behavior was measured in 97 patients. Among these patients, a significant increase in weekly physical activity was observed ($p=0.01$), increasing from an average of 8.2 MET-hours per week of activity to 18.6 MET-hours per week[32]. Self-reported fatigue remained stable among the patients who reported exercising regularly[32].

While the preliminary evaluation suggests adequate utilization of the program and subsequently successful integration within the clinic workflow, and ultimately increased physical activity behavior, the authors note that the main challenge with this model is the cost of human resources and lack of additional funding from hospital resources, such as the oncology or physical therapy departments[32]. This will ultimately effect long-term sustainability of this model and translation worldwide in other countries and health care systems. Currently, the model is fully funded by the nonprofit organization, Hope and Cope.

Community-Level Cancer Rehabilitation Program etails

In 2012, the Danish Cancer Management Program mandated municipalities to provide community-based cancer rehabilitation by 2013[34]. The aim of this program was to ensure

accessible, comprehensive, patient-centered cancer rehabilitation services throughout the cancer trajectory[34]. In this model, the hospital was responsible for providing specialized rehabilitation conducted by a licensed rehabilitation professional and the municipalities were responsible for providing general rehabilitation from various health professionals[33]. Services provided not only covered aspects of physical functioning, but also psychological, and social and/or cognitive functioning. Therefore, this model not only included licensed rehabilitation professionals and exercise physiologists, but also included other health professionals such as dietitians, psychologists, etc. Similar to the ActivOnco model, any cancer patient, regardless of type, stage, and treatment plan or history, were eligible to participate in the community-based program. Referrals for the program typically came from the oncology team, hospital staff, or primary care physician[36]. Once the referral was made, assessments and evaluations of the patient's goals were conducted at the designated sites in the community.

Community-Level Cancer Rehabilitation Program Efficacy & Challenges

Kristiansen and colleagues[34] conducted a survey among 98 Danish municipalities in 2013 (baseline) and followed up in three years (2016) to examine utilization of the model. In all, the majority of municipalities, 95%, reported providing community-based rehabilitation services targeting cancer patients, with group-based physical activity as the most widely used service[34]. Most municipalities, 84%, reported collaborating services with private or voluntary providers. Examples of private and voluntary providers include but are not limited to cancer societies, home nursing, exercise and fitness center, and religious associations[34]. Regarding referrals, the majority of referrals to the community-based programs were from hospital staff or primary care providers. A total of 46% of municipalities reported inequalities in care provided for racial and ethnic patients and 28% reported inequalities between younger and older patients. Furthermore, 9% observed lower referral rates in men compared to women[34].

In addition, Rossen and colleagues[37] recently conducted a prospective longitudinal study among breast cancer survivors participating in one of the sites of this community-based

program to assess the impact of this program on health-related quality of life and upper limb function. Among the 56 survivors who completed the Functional Assessment of Cancer Therapy-Breast (version 4) prior to starting and at completion of the program, a significant and clinically meaningful increase in health-related quality of life was observed upon completion of the program (+8.1 points, $p<0.001$)[37]. Among the 26 survivors who completed the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire prior to starting and at completion of the program, a significant decrease in upper limb disability was observed (-17.5 points, $p<0.001$)[37]. Overall, the authors suggest that this program promotes improvements in health-related quality of life[37].

In all, while evidence suggests fair utilization of the model and improvements in health-related quality of life and upper limb function among breast cancer survivors within the program, challenges still exist. Kristiansen and colleagues[34] note the following as major challenges with this model: varying utilization across cancer types, lack of communication between the hospital and municipalities, and lack of communication among municipalities regarding consistencies in procedures and documentation. Furthermore, this model is unique in that it was mandated by the state and therefore is free of charge to patients. In terms of translation to other countries and health care systems, the cost structure is a severe limitation.

Summary of Limitations of Existing Models & Suggested Future Directions

Among the cancer rehabilitation programs worldwide that successfully integrate rehabilitation and exercise training, challenges exist regarding consistent communication with the oncology team and integrating the rehabilitation model in the oncology care plan. Additionally, a limitation in translating these models to other countries is that both programs are offered free of charge to patients and are paid for either by foundation money (ActivOnco) or the state (Danish Cancer Management). As always, foundation sources of charitable dollars can be tenuous. Moreover, missing from the evidence related to programs that successfully integrate rehabilitation and exercise training into cancer care is evidence related to the efficacy of the

program on disease-free survival and physical outcomes, such as cardiorespiratory fitness, physical function, and ability to complete activities of daily living. Central to making such determinations is the need for a clear understanding of the durability of lifestyle changes advocated in a rehabilitation program, regardless of what setting contains and operates the program. Exercise programs have life spans measured in weeks, survivorship is increasingly measured in years and even decades.

Moving forward, future models should consider the following components: efficient communication between the cancer rehabilitation team and oncology team, which may be done via integration of the cancer rehabilitation program within the oncology care plan and a streamlined referral process within the clinical workflow; inclusion of various reimbursement or payment options to lead to translation worldwide, and with this, the inclusion of cost-effective analysis; and finally periodic reports on the efficacy of the program on disease-free survival and physical outcomes associated with survival.

Conclusion

This article aims to assist nurses to better understand the differences between rehabilitation and exercise training, and how both licensed rehabilitation professionals and exercise physiologists can successfully and safely collaborate to provide optimal exercise services for cancer survivors. According to the Institute of Medicine of the National Academies[38], upon completion of primary cancer treatment, the cancer survivor should be provided with an evidence-based survivorship care plan aimed to help identify and manage cancer treatment-related side effects. Exercise is a sound approach to improving survivorship care. Among cancer survivors, engagement in regular exercise, and subsequently higher levels of cardiorespiratory fitness, is associated with significant improvements in clinical and functional outcomes[1], attenuating treatment-related side effects[1], and in some cases survival outcomes[1], such as mitigating risk of cancer-specific mortality[2,4-7]. There are two professionals qualified to provide exercise for cancer survivors, licensed rehabilitation professional and exercise

physiologists. Both professions consist of complementary skillsets that when integrated under the umbrella of cancer rehabilitation, will optimize the survivorship care plan and provide promising outcomes in terms of overall health and cancer survival.

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Table 1:

Differences Between Rehabilitation and Exercise Physiology Professionals

	Rehabilitation	Exercise Physiology
General Focus of Field	Helps individuals with health conditions to optimize mental and physical function in their daily life[13,14].	Impact of acute and chronic exercise training on physiological mechanisms underlying physical and mental health, prevention and/or treatment of chronic diseases, and athletic performance enhancement[16].
Focus in the Context of Cancer	Oncology rehabilitation focuses on treating comorbidities and functional deficits secondary to cancer and/or its treatment.	Exercise oncology focuses on using exercise training to prevent or minimize physical deconditioning that results from inactivity and treatment-related side effects.
Setting of Profession	One-on-one, supervised: --Inpatient --Outpatient --Long-term care Group activities in medical facility, supervised Home-based, unsupervised[17-20]	Supervised and unsupervised settings
Goal of Profession	Optimize physical functional deficits[15]	Correct physical deconditioning, improve human performance, understand associated physiological mechanisms

Table 2

Existing Rehabilitation Models as Presented in the Expert Group Statement

	Post-Acute Care	Home Care	Outpatient Ambulatory Care
Setting	Inpatient rehabilitation facilities Long-term care Skilled nursing Hospice	Home-based	Outpatient Home-based
Services Offered	Physical therapy Occupational therapy Speech therapy Nutrition Psychology Nursing	Nursing staff provides majority of services based on assessment Physical therapy Occupational therapy	Nursing Physical therapy Occupational therapy
Challenges	Not consistent with oncology care plan Lack services addressing needs exclusive to cancer survivors Insurance coverage is not guaranteed	Lack services addressing needs exclusive to cancer survivors	Not consistent with oncology care plan Inconsistencies across sites that offer this model in services offered, timing of services, and amount of follow-up

Data in table adapted from Stout and colleagues[24]

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