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Despite evidence that performing physical activity (PA) is beneficial to people who have lung cancer, fear of PA is a barrier that can cause sedentary behavior. Rehabilitation strategies to overcome fear and promote regular PA are needed, and physical therapists are ideal providers due to their close-knit working relationship with patients. However, it is not known if physical therapists have knowledge of exercise guidelines for people with lung cancer. The purpose of this study was to determine physical therapists' knowledge and application of the PA guidelines for patients with lung cancer. We collected survey data from licensed physical therapists in North Carolina examining their knowledge of exercise guidelines and how they promote PA for their patients with lung cancer. Only 18.9% of therapists identified the duration of moderate intensity exercise needed to reduce cancer related fatigue which is a major side effect of lung cancer. Hypertension is a comorbidity affecting many people with lung cancer and less than a third of therapists (29.4%) correctly answered a question on how much moderate intensity exercise is needed to help control it. Less than half of participants (39%), recognized the correct frequency of muscle strengthening exercises which are an integral component of the exercise guidelines for lung cancer. Many therapists (38.2%) reported they do not work with people who have lung cancer when asked how often they promote PA for this population and 50% of therapists stated they wanted more education to work with people who have lung cancer. Encouragingly, these findings highlight that therapists have gaps in their knowledge, and that they are willing to receive more education in working with people who have lung cancer. Since

lung cancer is the number one cause of mortality among all cancers, such efforts could make a large impact in the field of cancer rehabilitation.

PHYSICAL THERAPISTS' KNOWLEDGE AND PROMOTION OF PA IN PATIENTS WITH LUNG CANCER

by

Scot Merrill Sawyer

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Dr. Erin Reifsteck
Committee Chair

DEDICATION

This dissertation is dedicated to my wife, Mary, and my sister Martha. Martha believed in me at an early age and encouraged me to pursue higher education. Without Mary's unwavering support, I would never have come this far towards achieving my professional goals.

APPROVAL PAGE

This dissertation written by Scot Merrill Sawyer has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Co-Chair _____
Dr. Erin Reifsteck

Committee Co-Chair _____
Dr. Traci Parry

Committee Member _____
Dr. Diane Gill

June 20, 2023
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April 6, 2023
Date of Final Oral Examination

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Promotion of PA by physical therapists for people with lung cancer is necessary to help patients battle treatment side effects like fatigue. Lung cancer is the second most common cancer with a median age of diagnosis of 70 years of age; approximately 228,150 new cases were diagnosed in the United States in 2019 (National Institutes of Health, 2019). The diagnosis of lung cancer has a huge impact on people's lives and often results in common side effects of shortness of breath and fatigue. Fatigue is one of the most prevalent side effects of lung cancer that is experienced by 75% of survivors, leading to a significant decline in function (Jung et al., 2018), and having long term effects in tolerance for activities of daily living (ADL) such as making a meal, dressing, work, or shopping (Wan et al., 2017).

Overwhelming fatigue may last several months or even years, keeping people with cancer from being independent with ADLs (Solvik et al., 2020), and placing a significant burden on family, caregivers, and the person who has cancer (Jung et al, 2018). Not surprisingly, lessening symptoms of fatigue is viewed as extremely important to many patients with lung cancer (Ha et al., 2018). Despite the high incidence and concern of fatigue, it is often mishandled by health care professionals (Izzo et al., 2019). PA involving aerobic exercise may significantly reduce fatigue leading to greater strength and tolerance for ADLs (Avanci et al., 2019; Cramp & Daniel, 2012; Edvardsen et al., 2015; Wang et al., 2016). Although fitness levels in patients with lung cancer are significantly below average for healthy adults, PA has been found to be safe for this population (Avanci et al., 2019). Health care providers, including physical therapists, are encouraged to promote PA to combat cancer and improve cardiorespiratory function (Exercise is Medicine, 2019; Meyer, 2010). However, more information about physical therapists'

knowledge and practices in this area is needed to ensure that PA is promoted effectively in rehabilitation efforts for people with cancer.

Background

Physical therapy education is directed toward becoming a movement expert, which enhances the quality of patients' lives by improving function for people who have specific health conditions such as musculoskeletal injuries, neuromuscular deficits, and chronic conditions such as cancer (APTA, 2021). The American Physical Therapy Association (APTA, 2018) supports physical therapists in using the second edition of the PA Guidelines developed by the United States Department of Health and Human Services (USDHHS, 2018) with their patients. These guidelines recommend that adults should perform 150 minutes of moderate intensity PA per week or 75 or more minutes of vigorous PA per week. Furthermore, the second edition of the PA guidelines recommends that adults with chronic conditions such as Type 2 diabetes, hypertension, and cancer should also perform the recommended amount of PA. However, when that is not possible, adults with chronic conditions such as cancer should perform regular PA in accordance with their abilities and avoid inactivity (USDHHS, 2018).

Recently in 2019, ACSM developed exercise guidelines (ACSM, 2019) for cancer survivors specifically. These guidelines do not outline exercises for specific types of cancers, rather they provide guidelines for exercise prescription using the frequency, intensity, time, and type (FITT) principle to help mitigate health outcomes for people with cancer. The multi-disciplinary roundtable of experts who developed the ACSM guidelines for cancer survivors (ACSM, 2019) provided evidence supporting that exercise helps alleviate symptoms of anxiety, depression, fatigue, lymphedema, and physical function when exercise programs were developed using the FITT principle for cancer survivors. For example, the ACSM guidelines for people

with cancer recommend 30 minutes of moderate intensity PA 3 times per week for a period of 12 weeks to help alleviate symptoms of fatigue (ACSM, 2019). Although evidence supports the benefits of PA for patients with lung cancer, Tran et al. (2018) found that only 40 percent of patients participated in regular PA.

People with lung cancer often do not engage in PA due to fatigue and fear of PA (Granger et al, 2017; Ormel et al., 2018; Mikkelsen et al., 2019). Alternatively, regular PA can reduce side effects of treatment for people with lung cancer. For example, Kuehr and colleagues (2014) studied people being treated for advanced lung cancer and developed an exercise program which was performed for eight weeks at five times per week. Results from this study showed an increase in overall strength and the six-minute walk test for patients who participated (Kuehr, et al, 2014). While it is known that PA improves quality of life for patients with lung cancer, this evidence has not yet been translated into clinical practice for physical therapists (Granger et al., 2017; Tran et al., 2018; Mas et al., 2015).

Rehabilitation programs are more effective for patients with lung cancer when the treatment program is designed for an individual person and based on the individual's goals and capabilities (Peppercorn et al., 2011). Physical therapists have been recognized as being a choice provider of rehabilitation for people who have cancer (Shirley, 2010) due to their work in a rehabilitative environment and are poised appropriately to offer individualized PA strategies for their patients with cancer. Due to rising rates of people who survive cancer, physical therapists should expect to have more people with cancer on their caseload (Allappattu et al, 2015). However, it is not known to what extent physical therapists use PA guidelines in their practice for patients with lung cancer, though studies have revealed that physical therapists do not

regularly promote PA to their patients in general (Rethorn, 2021; Freene, 2017; Shirley, 2010; Aweto, 2013).

Rehabilitation provided by physical therapists for people after lung cancer surgery often focuses on basic ambulatory techniques, positioning, breathing and sputum clearance. There have been some studies suggesting that pre-operative care in combination with post-operative care is even more beneficial. Uda et al. (2018) found that there were fewer cases of post-operative pneumonia when both pre- and post-operative care was offered by physical therapists versus post-operative alone. A systematic review of pre-operative and home-based fitness programs only found one study that used prehabilitation as a component of care provided for patients with lung cancer (Driessen et al., 2017). This study found prehabilitation demonstrated improved strength, six-minute walk test distance, and improved cycling endurance for patients with lung cancer awaiting lung resection surgery (Coats, 2013). Even though physical therapists have been involved in rehabilitation with patients with cancer, their knowledge of PA promotion specifically remains unclear.

Recently, the Oncology Academy of the American Physical Therapy Association (APTA) developed a specialist certification process for physical therapists who wish to provide optimal care for individuals with cancer (APTA Oncology, 2020). However, specialization is not a mandatory process and not every therapist wants to specialize in the practice of oncology. Presently, there are approximately 133 board-certified oncologic physical therapists in the United States (APTA, 2021). Ultimately, it is up to the individual practitioner to gain and use knowledge to help people with cancer. Unfortunately, many people who have cancer do not have access to appropriate rehabilitation services, which might lead to loss of physical function, ability to work, participation in family activities, or suffer from cancer related fatigue. The physical therapy

profession has an opportunity to offer comprehensive care plans that include PA promotion for people with cancer (Stout, 2019).

Physical therapists can provide rehabilitative services for people with lung cancer from initial diagnosis through their lifespan. Determining physical therapists' knowledge of PA guidelines for lung cancer and to what extent they are promoting PA within their physical therapy practice to help lung cancer patients manage cancer fatigue and improve their quality of life is a necessary step toward implementing enhanced clinical rehabilitation practices in this population.

Purpose

The purpose of this study was to determine physical therapists' knowledge and application of the PA guidelines for patients with lung cancer.

Methods

An exploratory online survey using non-probability sampling of licensed physical therapists in North Carolina (NC) was administered to determine physical therapists' knowledge of PA guidelines, their promotion of PA practices with their patients, and their professional development needs pertaining to promoting PA in patients with lung cancer specifically.

Participants and Procedures

Study procedures were approved by the Institutional Review Board (IRB) at the University of North Carolina at Greensboro (UNCG). A written request was made to the State of NC Physical Therapist Association (APTANC) to send the survey invitation via email to licensed physical therapists in NC. The email, which contained information about the study and a link to complete the survey online through Qualtrics software, was distributed to 1990 physical therapists who are APTANC members, which represent 20% of the approximately 10,000

licensed physical therapists in NC. The survey invitation and link were also emailed to a list of all licensed physical therapists in the state of NC that was obtained via public record through the State Board of Physical Therapy Examiners (NCSBPT). Consent information was presented at the beginning of the survey before participants elected to continue with the survey. The survey was open for one month and there was a total of 309 responses, of which 238 participants completed the entire survey and were included in the final sample for analysis.

Survey Measures

Prior to administering the survey to participants, a draft version of the survey was sent to a panel of experts experienced in rehabilitative care for people with cancer who were asked to review and provide feedback on the readability, clarity, and accuracy of the survey through ratings (e.g., *Is the content accurate and appropriate* and *Is the question clear)* of individual items with space to provide open-ended comments. Panel recommendations included comments on clarity of wording adding text boxes for participant comments, changing Likert scale parameters, and deleting two questions. Questions were modified or omitted accordingly, resulting in a total of 47 questions included in the final version of the survey. A brief description of the main sections comprising the online survey that was developed for use in this study is included below. The full version of the survey can be found in Appendix A.

Demographics and General Questions

The survey began with demographic questions such as age, gender, ethnicity, workplace setting, employment status, years of experience, primary clinical focus, highest degree earned, and APTA Board certifications/residencies. Additional questions were included regarding how often participants work with people who have lung cancer, other types of cancer, or cardiopulmonary disorders in their physical therapy practice.

Knowledge of PA Guidelines

Participants were asked to respond to items (multiple choice and true/false) assessing their knowledge of the United States Department of Health and Human Services (USDHHS) PA Guidelines (PAG) for active adults, USDHHS PAG for older adults and adults with chronic health conditions, and the American College of Sports Medicine (ACSM) PAG for people with cancer.

Promotion of PA Guidelines

Participants were asked how often they promoted PA for people with general conditions, chronic conditions, cancer, and lung cancer respectively within their physical therapy practice using a 5-point Likert scale format (Never, Rarely, Sometimes, Often, Always). Additional items included how often participants used community resources or consulted with other physical therapists to promote PA for people with lung cancer.

Professional Development Needs

Participants were asked to what extent they wanted more education pertaining to PA for people with lung cancer and desirable methods of delivery.

Data Analysis

Survey data were downloaded from Qualtrics into SPSS version 28 for data cleaning and analysis. Frequency distributions were calculated for participant demographics. Knowledge questions were organized by percentage of correct versus incorrect responses. Frequency counts were used to describe responses to questions about how physical therapists promote PA (i.e., *Never, Rarely, Sometimes, Often, Always, or N/A- I do not work with this population).* Open-ended responses relating to physical therapists' strategies for promoting PA

were coded into three categories: direct care, education, and referral to other programs or services.

Results

Demographics

The sample was predominantly comprised of women (79%), with most participants falling within 31-60 years of age. Most participants worked full-time (71.0%), with 38.2% having over 20 years' experience. The highest degree obtained by most participants was the Doctor of Physical Therapy degree (62.2%). Participants most often reported working in an orthopedic clinic (33.6%). Complete demographic information is in Table 1.

Table 1. Participant Demographics

Gender	*n* (%)
Female	188 (79.9)
Male	47 (19.7)
Geographic Setting	
Urban	73 (30.7)
Rural	50 (21.0)
Suburban	105 (44.1)
Other	9 (3.8)
Years as PT	
1-2	28 (11.8)
3-10	72 (30.3)
11-20	46 (19.3)
Over 20	91 (38.2)
Age	
21-30	46 (19.3)
31-40	68 (28.6)
41-50	47 (19.7)
51-60	48 (20.2)
61-70	25 (10.5)
Over 70	3 (1.3)
Highest Degree Earned	
BS	24 (10.1)
Master's	52 (21.8)
DPT	148 (62.2)
PhD	6 (2.5)

EdD	3 (1.3)
Other	2 (0.8)
Employment Status	
Full-time	169 (71.0)
Part-time	32 (13.4)
Retired	6 (2.5)
Per Diem	18 (7.6)
Unemployed	4 (1.7)
Other	8 (3.4)
Race/Ethnic Origin	
White	21.4 (89.9)
Hispanic/Latino	10 (4.2)
Black	4 (1.7)
Asian	7 (2.9)
Prefer not to say	5 (2.1)

Many physical therapists reported that they had worked with people who had any cancer at least sometimes (43.7%), often (18.1%), or always (2.5%), but about one third of the sample never (2.9%) or rarely (32.4%) worked with cancer patients. Fewer participants worked with people who had lung cancer specifically (22.3% Never, 42.4% Rarely, 29.8% Sometimes, 4.6% Often, 0.4% Always).

Knowledge of PA Guidelines

Regarding the USDHHS PAG for Active Adults, many physical therapists were able to correctly identify an activity that represented moderate PA (52.5%), vigorous PA (69.3%), and how many minutes to gain health benefits for moderate PA (65.1%). However, only 38.7% of physical therapists correctly identified how many days per week are recommended for muscle strengthening activities and approximately 60% of physical therapists reported they were *not familiar* or only *somewhat familiar* with these guidelines at all. See Table 2 for complete results.

Table 2. Knowledge of USDHHS PA Guidelines for Active Adults

How familiar are you with the United States Department of Health and Human Services PA Guidelines for Active Adults?	
	n (%)
Not at all	46 (19.3)
Somewhat	100 (42.0)
Moderately	71 (29.8)
Extremely	20 (8.4)
Which exercise below is considered moderate intensity PA?	
Step aerobics	64 (26.9)
Singles tennis	0 (4.2)
*Dancing	125 (52.5)
Hiking uphill	38 (16.0)
Which exercise below is considered vigorous intensity PA?	
Yard work	4 (1.7)
Power Yoga	49 (20.6)
Water aerobics	19 (8.0)
*Swimming laps	165 (69.3)
At a minimum, how many minutes of moderate PA per week are needed for health benefits?	
60	18 (7.6)
120	55 (23.1)
*150	155 (65.1)
200	9 (3.8)
At a minimum, how many days per week of muscle strengthening activities are needed for health benefits?	
1	0 (0.0)
*2	92 (38.7)
3	136 (57.1)
4	9 (3.8)
Thirty minutes of moderate intensity PA is approximately the same as how many minutes of vigorous intensity PA?	
10	52 (21.8)
*15	126 (52.9)
20	52 (21.8)
30	6 (2.5)
How confident are you that your responses to the questions above related to PA for adults are correct?	
Not at all	47 (19.7)
Somewhat	126 (52.9)
Moderately	58 (24.4)
Extremely	6 (2.5)

* Indicates correct response

The majority of physical therapists correctly answered knowledge questions related to diabetes (61.8%), osteoarthritis (96.6%), muscle strengthening (50.8%), and obtaining medical clearance prior to initiation of an exercise program (97.1%). Significantly less than 50% of physical therapists answered the question related to hypertension correctly (29.4%). See Table 3 for results of knowledge questions for the USDHHS PAG for Older Adults and Adults with Chronic Health Conditions.

Table 3. Knowledge of USDHHS PA Guidelines for Older Adults and Adults with Chronic Health Conditions?

How familiar are you with the United States Department of Health & Human Services PA Guidelines for Older Adults with Chronic Health Conditions?	
	n (%)
Not at all	122(51.3)
Somewhat	87 (36.6)
Moderately	21 (8.8)
Extremely	6 (2.5)
Adults with Type 2 diabetes should perform a minimum of how many minutes of moderate intensity exercise per week?	
50	6 (2.5)
75	39 (16.4)
100	44 (18.5)
*150	147 (61.8)
Adults with hypertension should perform a minimum of how many minutes of moderate intensity per week?	
30	1 (0.4)
60	28 (11.8)
*90	70 (29.4)
120	137 (57.6)
Adults with osteoarthritis can expect improvements with regular PA in which of the following conditions below?	
Pain	2 (0.8)
Mental health	1 (0.4)
Physical function	3 (1.3)
Both a and b	3 (1.3)
*a, b, and c	230 (96.6)
Adults with chronic health conditions should perform muscle strengthening exercises how many days per week for health benefits?	
0	0 (0.0)

1	1(0.4)
*2	121 (50.8)
3	112(47.1)

Before older adults begin a moderate intensity exercise program, they should obtain:

*MD clearance	231 (97.1)
Heart rate monitor	4 (1.7)
Oxygen oximeter	0 (0.0)
Gym membership	0 (0.0)

How confident are you that your responses to the questions above about older adults with chronic health conditions are accurate?

Not at all	44 (18.5)
Somewhat	136 (57.1)
Moderately	45 (18.9)
Extremely	11 (4.6)

* Indicates correct response

Responses to the knowledge questions regarding the ACSM Exercise Guidelines for People with Cancer suggested most physical therapists could identify correct information pertaining to the FITT principle (86.1%), bone metastases (82.4%), and chemotherapy (99.6%), but few correctly answered the question regarding cancer-related fatigue (18.9%). Most were not familiar with the cancer guidelines (70.2%). See Table 4 for results of Knowledge of ACSM Exercise Guidelines for People with Cancer.

Table 4. Knowledge of ACSM Exercise Guidelines for People with Cancer

How familiar are you with the American College of Sports Medicine Exercise Guidelines for People with Cancer?

	n (%)
Not at all	167 (70.2)
Somewhat	56 (23.5)
Moderately	11 (4.6)
Extremely	3 (1.3)

The FITT principle, is a guide for exercise prescription, and refers to Frequency, Intensity, T____, and T____ which are:

*Time, Type	205 (86.1)
Tempo, Transfer	1 (0.4)
Time, Tempo	31 (13.0)
Transfer, Time	0 (0.0)

Moderate intensity exercise occurring 3 times per week for how many weeks can reduce cancer related fatigue?

6	89 (37.4)
8	90 (37.8)
10	13 (5.5)
*12	45 (18.9)

It is prudent to avoid all resistance exercise for patients who have bone metastases.

True	41 (17.2)
*False	196 (82.4)

Exercise for patients receiving chemotherapy can improve balance.

*True	237 (99.6)
False	1 (0.4)

How confident are you that your responses to the questions above about exercise for people with cancer are correct?

Not at all	53 (22.3)
Somewhat	125 (52.5)
Moderately	51 (21.4)
Extremely	7 (2.9)

* Indicates correct response

Promotion of PA in Physical Therapy Practice

Physical therapists most frequently reported that they "always" promote PA for general health conditions (67.2%), chronic health conditions (66.4%), and for their cancer patients (45.4%). Fewer physical therapists reported they always promote PA for patients with lung cancer specifically (28.2%), with 38.2% reporting they do not work with this population. After removing participants who do not work with this population, 46% reported they always promote PA for patients with lung cancer. Among the physical therapists who work with lung cancer patients, 32.2 % responded they rarely use community resources/collaborators to promote PA in this patient population, and 36.0% reported they never promote PA for lung cancer patients to other physical therapists informally or formally (e.g., presentations, professional conferences, media). See Table 5 for full results.

Table 5. Promotion of PA

	Never	Rarely	Sometimes	Often	Always	N/A I do not work with this population
How often do you promote PA for your patients with general health conditions? *n* (%)	1 (0.4)	0 (0)	6 (2.5)	60 (25.2)	160 (67.2)	10 (4.2)
How often do you promote PA for your patients with chronic health conditions? *n* (%)	2 (0.8)	1 (0.4)	7 (2.9)	62 (26.1)	158 (66.4)	7 (2.9)
How often do you promote PA for patients with cancer? *n* (%)	3 (1.3)	3 (1.3)	21 (8.8)	64 (26.9)	108 (45.4)	38 (16.0)
How often do you promote PA for patients with lung cancer? *n* (%)	6 (2.5) * (6.4)	5 (2.1) * (3.4)	24 (10.1) * (16.4)	44 (18.5) * (30.1)	67 (28.2) * (46.0)	91 (38.2)
How often do you use community resources to promote PA for patients with lung cancer? *n* (%)	38 (16.0) * (25.0)	49 (20.6) * (32.2)	43 (18.1) * (28.2)	17 (7.1) * (11.2)	5 (2.1) * (3.3)	85 (35.7)
How often do you promote PA for patients with lung cancer to other physical therapists? *n* (%)	54 (22.7) * (36.0)	44 (18.5) * (29.03)	36 (15.1) * (24.1)	13 (5.5) * (8.7)	3 (1.3) * (2.0)	87 (36.6)

* Denotes frequencies with N/A removed

There was a total of 68 open ended responses to the question, *What strategies do you use to promote PA to your patients with lung cancer?* Responses were coded into three categories for direct care (50%), referrals (32%), and education strategies (18%). See Table 6 for example strategies related to direct care, referrals, and education.

Table 6. Example Strategies to Promote PA

What strategies do you use to promote PA to your patients with lung cancer?

	n (%)
Direct Care	34 (50)
Breathing	
Energy conservation	
Strengthening	
Balance	
Referrals	22 (32)
CP rehab	
HH PT	
Recreation programs	
YMCA	
Education	12 (18)
YouTube videos	
Home exercise programs	
Pain science education	
Current evidence on PA	

For questions regarding continuing education on PA for people with cancer, most physical therapists agreed or strongly agreed they would like to have more education on this topic (71.0%), and that they would like it to be in the format of online courses (73.1%). See Table 7 regarding continuing education on PA for people with lung cancer.

Table 7. Education on PA for People with Lung Cancer

I would like to have more education pertaining to PA for people with lung cancer.

	n (%)
Strongly agree	50 (21.0)
Agree	119 (50.0)

Not agree/disagree	53 (22.3)
Disagree	9 (3.8)
Strongly disagree	5 (2.1)

Which method below would be best for you to obtain more education pertaining to PA for people with lung cancer?

	n (%)
Online course	174 (73.1)
Workshop	20 (8.4)
Conference Session	20 (8.4)
Other	15 (6.3)

Discussion

The first part of this study was to determine physical therapists' knowledge of PA guidelines for patients with lung cancer. Due to the average age for a diagnosis of cancer being between 65-70 years, the USDHHS PAG for active adults and older adults/ adults with chronic health conditions are relevant to the knowledge base necessary to apply the ACSM guidelines for lung cancer survivors. Overall, participants in this study responded they were not very familiar with the basic USDHHS PAG for active adults and were less familiar with the more specific guidelines for adults with chronic conditions and for the ACSM guidelines for people with cancer. Not being very familiar with the USDHHS PAG for active adults is an indication of a knowledge gap that disallows physical therapists an understanding of how to apply basic principles to the more specific guidelines for adults with chronic conditions and for people with cancer.

In answering questions related to the USDHHS PAG for active adults, physical therapists answered a question related to application of strengthening exercises incorrectly which is suggestive of a knowledge gap related to this topic. Strengthening when combined with aerobic activity at a frequency of 2-3 times per week for 6-12 weeks is a key component for people with cancer to help abate symptoms like anxiety for people with prostate, breast, lung, and

hematological cancers (ACSM, 2019). Less than 30% of physical therapists correctly answered a question on hypertension in the PAG for older adults with chronic health conditions, suggesting physical therapists' lack some knowledge areas in these guidelines. Hypertension is often a significant side effect for people with lung cancer due to cardiotoxicity caused by chemotherapy or radiation (NIH, 2018). To improve knowledge in these areas, it is recommended that physical therapists join the American Physical Therapy Association Council on Prevention, Health Promotion, and Wellness in Physical Therapy (APTA, 2020). By joining the council, physical therapists will have access to critical resources like the Guide to Physical Therapy Practice with a sub-section on Prevention and Wellness. The council is also part of a community of physical therapists to help disseminate best practices for promotion of health and wellness.

One of the more common side effects of cancer and its treatment is fatigue, which is experienced by more than 70% of people who have cancer. Cancer-related fatigue often negatively affects quality of life and leads to a significant decline in function related to ADLs such as planning a trip, balancing a checkbook, or dressing themselves. The fatigue may last for a several months or even years beyond the time of active cancer and/or its treatment. Aerobic and muscle strengthening exercises have been shown to improve cancer-related fatigue for people with lung, breast, prostate, and hematological cancers (ACSM, 2019). However, less than 20% of physical therapists in this study correctly answered the question for cancer-related fatigue within the ACSM guidelines for people with cancer. It is recommended that physical therapists self-direct their learning about cancer-related fatigue through the article containing the ACSM exercise guidelines for people with cancer (ACSM, 2019). The APTA also provides on-site continuing education courses for a reasonable cost pertaining to these guidelines for groups of physical therapists who work with this population.

The second part of this study was to determine how physical therapists are promoting PA for their patients with lung cancer. This study found the majority of physical therapists indicated they work with people who have general and chronic health conditions, and they *often* or *always* promote PA for people with these conditions. Yet, the majority of physical therapists reported they do not work with people who have lung cancer, but for those therapists who reported they do work with this population, they are not promoting PA. Physical therapists also reported they *never* or *rarely* promote PA for people with lung cancer through community resources or other physical therapists. The individual participants who chose to provide open-ended comments offer some insight into how physical therapists are promoting PA within this unique patient population. Some physical therapists offer PA to their lung cancer patients by providing *walking programs, energy conservation techniques, and pain management* strategies. Other physical therapists refer patients with lung cancer to *cardiopulmonary rehab, hospice,* and *YMCA* groups to help their patients with PA, and some physical therapists provide education through *YouTube videos, home exercise programs,* and *helping patients form healthy habits.* However, no open-ended response from this sample of physical therapists indicated they offer a structured program to work with people who have lung cancer. A structured program would first test the patient to determine 1) physical impairments that affect daily function such as walking, interacting with family, work, or recreational activities, and 2) cardiopulmonary response to exercise - which is especially critical to working with people who have lung cancer - in order to be safe and effective. Based on these results, interventions addressing functional limitations, that promote regular PA and education on management of fatigue and other side effects of lung cancer or its treatment, can then be implemented.

Importantly, the findings from this study suggest that some physical therapists offer some help to patients who they encounter with lung cancer, but many physical therapists do not feel comfortable in their knowledge for promoting PA for people with lung cancer or do not work in settings where people with lung cancer are referred to them. Consequently, people with lung cancer may not have the opportunity to learn how to safely perform exercise and reduce side effects such as cancer-related fatigue to live the highest quality of life possible. Considering lung cancer has the highest mortality rate out of all cancers (CDC, 2019), it is problematic that more therapists are not better prepared to work with people who have lung cancer. While there appear to be some gaps in NC physical therapists' knowledge and promotion of PA, it is promising that most participants desired more education pertaining to PA for lung cancer patients. The majority of physical therapists would prefer education to be in an online format. However, to date, there are no known online educational programs available for physical therapists with the purpose of addressing PA for people with lung cancer.

Limitations and Recommendations

The small sample size is a main limitation of this study. Out of approximately 10,000 physical therapists who are licensed in NC, only 238 physical therapists completed the survey. This survey was conducted at a time when the COVID-19 pandemic was occurring and physical therapists were inundated with multiple surveys during the pandemic, likely limiting the response rate to this survey. Additionally, the focus of the study was on lung cancer, yet most participants who completed the survey stated they rarely or never work with this population. Given the smaller population of physical therapists in this setting, future research should involve targeted focus groups with physical therapists who work with people who have lung cancer to better delineate barriers or facilitators of physical therapists' knowledge and what they may need

to supplement their existing knowledge. This study suggests that physical therapists in NC have gaps in their knowledge to implement their skills and effectiveness in promoting PA for those people with lung cancer.

Conclusion

There are few if any studies that have specifically looked at knowledge of physical therapists related to PAGs for people with lung cancer. Results of this study indicated the average percentage of correct answers was between 55 and 72% for three different PAGs assessed in this sample. This suggests gaps remain in the knowledge and practice of PA promotion in this patient context, leaving many physical therapists at a disadvantage in treating people who have lung cancer and their patients at a loss of receiving care that can improve their quality of life. Even though the sample size is small, answers to questions related to hypertension and cancer-related fatigue, which are two known major factors in working with people who have any cancer, highlight a concerning knowledge gap for physical therapists that should be addressed through continuing education. Encouragingly, this study does indicate that physical therapists are willing to receive more education on how to work with people who have lung cancer.

CHAPTER II: DISSEMINATION

Research Synopsis

This study was performed using a survey that was sent to all licensed physical therapists in North Carolina (NC). I plan to submit a proposal for a webinar containing a PowerPoint presentation (see Appendix B) outlining results from this study to be posted online on the NC physical therapists association website for immediate dissemination to all physical therapists in NC. Findings from this study found that physical therapists often do not work with people who have lung cancer, they have knowledge gaps in the United States Department of Health and Human Services Physical Activity Guidelines (USDHHS PAG, 2018) and the American College of Sports Medicine Exercise Guidelines for People with Cancer (ACSM, 2019), and physical activity promotional practices for people who have lung cancer are low.

Background

According to the American Cancer Society (2023), approximately 240,000 people in the United States will be diagnosed with lung cancer in 2023 and about 1 in 5 people will die from lung cancer, making this cancer the highest leader among all deaths due to cancer. Many people will also survive lung cancer and need rehabilitation that helps them live a fully functional life. Rehabilitation for those with lung cancer consists of supportive care such as regaining function to perform activities of daily living (ADLs), being active in family/work activities, and lessening the side effects of cancer or its treatment (ACS, 2023). Physical therapists' role in rehabilitative care for those with lung cancer can be guided by their professional training as physical therapists, the USDHHS PAG for active adults, USDHHS PAG for adults with chronic health conditions, and the ACSM exercise guidelines for people with cancer. Understanding the principles for PA

in both USDHHS PAG guidelines is necessary for effectively using the ACSM exercise guidelines for people with cancer.

Being diagnosed with cancer twenty years ago changed my life in ways that I was not prepared for. Simple tasks like getting up from a chair, walking across the room, and standing to prepare a simple meal took an extraordinary amount of time and physical effort. Performing recreational and work tasks changed due to cancer. As a physical therapist, I wondered what other people's experiences were with cancer and how could physical therapy help them return to recreational, family, and work activities. That led me to this research in which I found that many physical therapists have gaps in their working knowledge about physical activity for people who have lung cancer. My goal is to help other physical therapists promote physical activity to people with lung cancer.

Presentation Discussion

In the USDHHS PAG for active adults many physical therapists from my NC sample were incorrect in answering a question related to muscle strengthening exercise. Muscle strengthening exercise as a component of physical activity provides benefits not found in aerobic activity such as bone strength and muscle mass (USDHHS PAG, 2018). Strong bones and muscle are important for people who have bone metastases from lung cancer. Considering the average age for a diagnosis of lung cancer is between 65-70 years of age, age related loss of muscle mass is another reason why muscle strengthening is important for people with lung cancer (USDHHS PAG, 2018). Standard methods for measuring strength may include manual muscle tests or functional strength testing such as the Five Times Sit to Stand Test (Academy of Neurologic Physical Therapy, 2018). The 5XSTS test is used for lower extremity strength testing, assessing transitional movements such as going from a chair to a bed, and as an indicator

of balance deficits and fall risk. Information from strength tests during an evaluation can be used as a baseline for developing the muscle strengthening component of an exercise program. A program consisting of thirty-minutes sessions at a frequency of two-three times per week using both muscle strengthening and aerobic exercise has been shown to improve physical, mental, social, and functional health for people with lung cancer (ACSM, 2019).

In the USDHHS PAG for adults with chronic health conditions, physical therapists were not able to recognize how many minutes of moderate intensity PA are needed at a minimum to help control hypertension. People with lung cancer are at increased risk of high blood pressure, either as a pre-existing comorbidity or a direct side effect of chemotherapy or radiation. Recording resting blood pressure prior to and after a bout of exercise is a necessary part of measuring a cardiorespiratory response to PA for a person with lung cancer. The cardiorespiratory response can be used in developing a tailored and personalized exercise prescription using the Frequency, Intensity, Time, and Type (FITT) principle. The Six Minute Walk Test (Academy of Neurologic Physical Therapy, 2018) is often used for measuring a cardiorespiratory response in people who have lung cancer and can be easily used in a physical therapy clinic.

Physical therapists were also not knowledgeable in the ACSM PAG for people with cancer to treat cancer related fatigue (CRF). CRF is one of the most prevalent side effects of lung cancer and is experienced by at least 70-75% of survivors, which often leads to a significant decline in daily function such as making a meal, getting dressed, or performing work and recreational activities. CRF is often overwhelming and may last several months to years, placing a significant burden on the person who has lung cancer, their family, and their caregivers. People with lung cancer perform low levels of physical activity due to CRF, despite evidence showing

physical activity can improve it and result in a better quality of life. The Brief Fatigue Inventory (National Institutes of Health, 2021) and the Fatigue Severity Scale (AbilityLab, 2017) are tools to measure CRF and the ACSM PAG for people with cancer recommend a program consisting of aerobic and muscle strengthening activities for at least twelve weeks to reduce the effects of CRF (Campbell et al, 2019).

There were questions in the survey asking therapists how often they promote PA for people with lung cancer. They were asked whether they promoted PA directly themselves, used community resources, or referred people with lung cancer to other physical therapists formally or informally. Promotional practices for PA for all of these questions were low and the highest frequency answer was that they did not work with people who have lung cancer. When the physical therapists responded that they do not work with people who have lung cancer were removed, the frequency for promotional practices were still low. That indicates that people with lung cancer may not receive the rehabilitative care that is necessary for them to have the highest quality of life possible. Physical therapists also had the option to answer the promotional practice questions by writing in an open comment box on how they promote physical activity. A few therapists chose this option and upon examination, these responses gave insight into how some therapists promote PA for their patients with lung cancer. The responses were categorized into three themes on how physical therapists promote PA for their patients with lung cancer: direct care, referrals, and education. Direct care included methods of relaxation through proper breathing techniques, energy conservation techniques, muscle strengthening activities, and balance strategies to prevent falls. The referral theme included sending people with lung cancer to other healthcare providers such as exercise physiologists in cardiopulmonary rehabilitation programs, community recreation programs, and YMCA programs. A few physical therapists

used the education theme by promoting PA with home exercise programs, or YouTube videos containing strategies for PA. These methods are pieces of PA strategies but not a complete and structured program from which people with lung cancer may fully benefit. Ideally, a physical therapist would promote PA that is individualized to the person's goals and capabilities which would contain multiple strategies.

Two of the final questions in the survey were pertaining to whether physical therapists would want more education on how to work with people who had lung cancer and how they would want this education to be delivered. The majority of physical therapists indicated that they desired more education, and they want it delivered in an online format. Even though the sample size was small for this study, this finding is encouraging and significant considering the magnitude of people who are living with lung cancer. Physical therapists are well positioned to play a significant role in providing physical activity for people with lung cancer. Here are a few recommendations for physical therapists to better help people with lung cancer. Obtaining a cardiorespiratory response is critical for developing an exercise program. An easy way to do this is with the Six-Minute Walk Test (6MWT). It is easy to use and time efficient. Follow this link to the 6MWT. Cancer-related fatigue is often a major barrier that prevents people with lung cancer from engaging in physical activity. The Brief Fatigue Inventory (BFI) is a time efficient way to measure cancer-related fatigue. The information gathered from the BFI will give clues as to the types of activities that are most difficult for your patient. Follow this link for the BFI. Obtaining a measure of strength is also necessary to help develop an exercise program. The Five Times Sit to Stant Test (5XSTS) is a way to measure functional strength efficiently. Follow this link to the 5XSTS (see Appendix B for presentation slides).

CHAPTER III: ACTION PLAN

Even though the sample size was small for this study, the results reveal that physical therapists in North Carolina (NC) have knowledge gaps in the United States Department of Health and Human Services Physical Activity Guidelines (USDHHS PAG), the American College of Sports Medicine (ACSM) exercise guidelines for people with cancer, and physical activity promotional practices are low. The following plans will provide avenues to further educate physical therapists and provide an opportunity for further research on people with lung cancer.

Short Term Plans

The study revealed that 70% of physical therapists want more online education pertaining to working with people who have lung cancer. An online education module will be developed with the intent of offering tools for physical therapists to help provide and promote physical activity for people who have lung cancer. The primary target for the education module is physical therapists who are working in small, rural clinics where lung cancer patients are treated outside of major hospitals in NC such as Duke University, UNC, Moses Cone, Wake Forest, and Charlotte (see Appendix C for a list of rural cancer clinics).

In order to develop an appropriate exercise program for people with lung cancer, accurate measurements for a cardiorespiratory response, strength, and cancer-related fatigue are needed. To measure the cardiorespiratory response, the Six-Minute Walk Test (6MWT) is a tool based on evidence that works well for people with lung cancer (Academy of Neurologic Physical Therapy, 2018). For measuring strength, the Five Times Sit To Stand Test (5XSTS) is a tool that can measure functional strength accurately (Academy of Neurologic Physical Therapy, 2018). Cancer-related fatigue (CRF) affects at least 70% of people who have lung cancer, and the Brief

Fatigue Inventory (BFI) is a time efficient tool to measure CRF (National Institutes of Health, 2021). A primary resource to help physical therapists accomplish this is to become familiar with the American College of Sports Medicine Exercise Guidelines for People with Cancer (ACSM, 2019). In development of an exercise program for people who have lung cancer, becoming familiar with the American College of Sports Medicine Exercise Guidelines for People with Cancer is necessary (ACSM, 2019). These guidelines provide recommendations on how to develop an appropriate exercise prescription based on the best available evidence from randomized controlled trials. As part of the education module, a brochure containing tips on how physical therapists can promote physical activity will be developed. The brochure can be distributed by physical therapists to people with lung cancer in their community.

Long Term Plans

Considering that lung cancer has the highest mortality rate for all cancers, it is reasonable to research further what physical therapists need to work with people who have lung cancer. Focus groups throughout North Carolina may be a way to better delineate the needs of physical therapists in regard to working with people who have cancer. Several questions arose from the information gathered in this initial survey that could be used to initiate discussion with focus groups of physical therapists. Do physical therapists have the time in the clinic to successfully work with people who have lung cancer? Are they applying the principles of the American College of Sports Medicine guidelines for people with cancer? Do they believe that people with lung cancer need specialized services such as in a cardiopulmonary rehabilitation program? How do they use the United States Department of Health and Human Services Physical Activity Guidelines to promote physical activity for their patients with lung cancer?

I believe it is also necessary to learn from people who have lung cancer and to determine their perceptions of physical activity. A standardized questionnaire could be developed that would outline what people who have lung cancer want in their rehabilitation programs. This questionnaire could be distributed by physical therapists in any clinic where people who have lung cancer seek care. Gathering information from people who have lung cancer pertaining to physical activity would be useful to develop successful rehabilitation programs and assess the effectiveness of new programs developed by physical therapists.

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APPENDIX A: SURVEY QUESTIONNAIRE

1. What is your age?
    a. 21-30
    b. 31-40
    c. 41-50
    d. 51-60
    e. 61-70
    f. Over 70
    g. Prefer not to say

2. What is your gender?
    a. Male
    b. Female
    c. Prefer not to say
    d. Other (open text box to specify)

3. What is your race? (Check all that apply)
    a. White (not of Hispanic origin)
    b. Hispanic/Latino
    c. Black or African American
    d. American Indian or Alaska Native
    e. Asian
    f. Native Hawaiian or Pacific Islander
    g. Prefer not to say
    h. Other (open text box to specify)

4. What location is the geographic setting of your workplace?
    a. Urban
    b. Rural
    c. Suburban
    d. Other (open text box to specify)

5. What is your current employment status at your primary work setting?
    a. Full-time
    b. Part-time
    c. Retired
    d. Per Diem
    e. Unemployed
    e. Other (0pen text box to specify)

6. How many years have you worked as a physical therapist?
    a. 1-2
    b. 3-10
    c. 11-20

d. Over 20

7. What is your primary clinical focus in your practice as a physical therapist?
a. Acute care
b. Aquatics
c. Cardiovascular pulmonary
d. Geriatrics
e. Hand Rehabilitation
f. Lymphedema Management
g. Neurology
h. Oncology
i. Orthopedics
j. Pediatrics
k. Sports
l. Women's health
m. Wound management
n. Home Health
o. Other (open text box to specify)

8. What is your highest earned academic degree?
a. Baccalaureate
b. Master's
c. DPT
d. PhD
e. EdD
f. Other (open text box to specify)

9. Do you have any APTA board certifications?
a. Yes
b. No

10. If yes, please check all that apply. If no, skip this question.
a. Cardiovascular pulmonary
b. Clinical electrophysiology
c. Geriatrics
d. Neurology
e. Oncology
f. Orthopedics
g. Sports
h. Pediatrics
i. Women's Health
j. Other (open text box to specify)

11. Have you completed any residency, fellowship, or other certification training?
a. Yes

b. No

12. If so, please list any residency, fellowship, or other certification training you have completed. (open text box to specify)

13. Have you participated in any continuing education pertaining to physical activity for people with cancer?

a. Yes
b. No

14. If so, please list any continuing education pertaining to physical activity for people with cancer you have completed. (open text box to specify)

15. How often do you work with people who have cardiopulmonary disorders?

a. Never
b. Rarely
c. Sometimes
d. Often
e. Always

16. How often do you work with people who have cancer?

a. Never
b. Rarely
c. Sometimes
d. Often
e. Always

17. How often do you work with people who have lung cancer?

a. Never
b. Rarely
c. Sometimes
d. Often
e. Always

For many of the survey questions below, you will be asked about your knowledge and/or promotion of physical activity. The general definition of physical activity is any bodily movement produced by skeletal muscles that require energy expenditure. Physical activity includes exercise as well as activities which involve bodily movement and are done as part of playing, working, house chores, and recreational activities.

The United States Department of Health and Human Services has published **Guidelines for Physical Activity for Active Adults.** These guidelines provide recommendations for mild/light, moderate, and vigorous physical activity as well as resistance/muscle strengthening activities. The following questions refer to those guidelines.

18. How familiar are you with the United States Department of Health & Human Services **Physical Activity Guidelines for Active Adults?**

a. Not at all
b. Somewhat
c. Moderately
d. Extremely

19. Which exercise below is considered **moderate** intensity physical activity?

a. Step aerobics
b. Singles tennis
c. Ballroom dancing
d. Hiking uphill

20. Which exercise below is considered to be **vigorous** intensity physical activity?

a. General yard work
b. Power yoga
c. Water aerobics
d. Swimming laps

21. At a minimum, how many minutes of **moderate** physical activity per week are needed for health benefits?

a. 60
b. 120
c. 150
d. 200

22. At a minimum, how many days per week of muscle strengthening activities are needed for health benefits?

a. 1
b. 2
c. 3
d. 4

23. Thirty minutes of **moderate** intensity physical activity is approximately the same as how many minutes of **vigorous** intensity physical activity?

a. 10
b. 15
c. 20
d. 30

24. How confident are you that your responses to the questions above related to physical activity for adults are correct?

a. Not at all
b. Somewhat
c. Moderately

d. Extremely

The United States Department of Health and Human Services has published **Physical Activity Guidelines for Older Adults** with Chronic Conditions such as cancer, diabetes, osteoarthritis, and hypertension. The following questions refer to those guidelines.

25. How familiar are you with the United States Department of Health & Human Services **Physical Activity Guidelines for Older Adults with Chronic Health Conditions?**

a. Not at all
b. Somewhat
c. Moderately
d. Extremely

26. **Adults with Type 2 diabetes** should perform a minimum of how many minutes of moderate intensity exercise per week?

a. 50
b. 75
c. 100
d. 150

27. **Adults with hypertension** should perform a minimum of how many minutes of moderate intensity exercise per week?

a. 30
b. 60
c. 90
d. 120

28. **Adults with osteoarthritis** can expect improvements with regular physical activity in which of the conditions below?

a. Pain
b. Mental health
c. Physical function
d. Both a and b
e. All of the above (a, b, and c)

29. **Adults with chronic health conditions** should perform muscle strengthening exercises how many days per week for health benefits?

a. 0
b. 1
c. 2
d. 3

30. Before **older adults** begin a moderate intensity exercise program, they should obtain:

a. medical clearance
b. heart rate monitor

c. oxygen oximeter
d. gym membership

31. How confident are you that your responses to the questions above about older adults with chronic conditions are correct?
a. Not at all
b. Somewhat
c. Moderately
d. Extremely

The American College of Sports Medicine has developed **Exercise Guidelines for People with Cancer.** "Exercise" refers to aerobic and/or resistance exercises for the questions below.

32. How familiar are you with the American College of Sports Medicine **Exercise Guidelines for Patients with Cancer?**
a. Not at all
b. Somewhat
c. Moderately
d. Extremely

33. The FITT principle, which is a guide for exercise prescription, refers to **F**requency, **I**ntensity, **T____** and **T**____, which are:
a. time and type
b. tempo and transfer
c. time and tempo
d. transfer and time

34. Moderate intensity exercise occurring 3 times per week for how many weeks can reduce cancer related fatigue?
a. 6
b. 8
c. 10
d. 12

35. It is prudent to avoid all resistance exercise for patients who have bone metastases?
a. True
b. False

36. Exercise for patients receiving chemotherapy can improve balance.
a. True
b. False

37. How confident are you that your responses to the questions above about exercise for people with cancer are correct?
a. Not at all

b. Somewhat
c. Moderately
d. Extremely

The following questions ask about physical activity practices and promotion of physical activity for the general population, people with chronic conditions, and people with cancer.

38. How often do you promote physical activity for your patients with **general health conditions?**
a. Never
b. Rarely
c. Sometimes
d. Often
e. Always
f. N/A (I do not work with this population)

39. How often do you promote physical activity for your patients with **chronic health conditions?**
a. Never
b. Rarely
c. Sometimes
d. Often
e. Always
f. N/A (I do not work with this population)

40. How often do you promote physical activity for your patients with **cancer?**
a. Never
b. Rarely
c. Sometimes
d. Often
e. Always
f. N/A (I do not work with this population)

The following questions ask about physical therapy practices and physical activity for people with **lung cancer.**

41. How often do you promote physical activity for patients with lung cancer?
a. Never
b. Rarely
c. Sometimes
d. Often
e. Always
f. N/A (I do not work with this population)

42. How often do you use community resources/collaborators (personal trainer, fitness expert, etc.) to promote physical activity for your patients with lung cancer?

a. Never
b. Rarely
c. Sometimes
d. Often
e. Always
f. N/A (I do not work with this population)

43. How often do you promote physical activity for patients with lung cancer to other therapists formally or informally (e.g., presentations, professional conferences, media, brochures, etc.)?

a. Never
b. Rarely
c. Sometimes
d. Often
e. Always
f. N/A (I do not work with this population)

44. What strategies do you use to promote physical activity to your patients with lung cancer? (open text box for comments)

The following questions are related to education on physical activity for people with lung cancer.

45. I would like to have more education pertaining to physical activity for people with lung cancer.

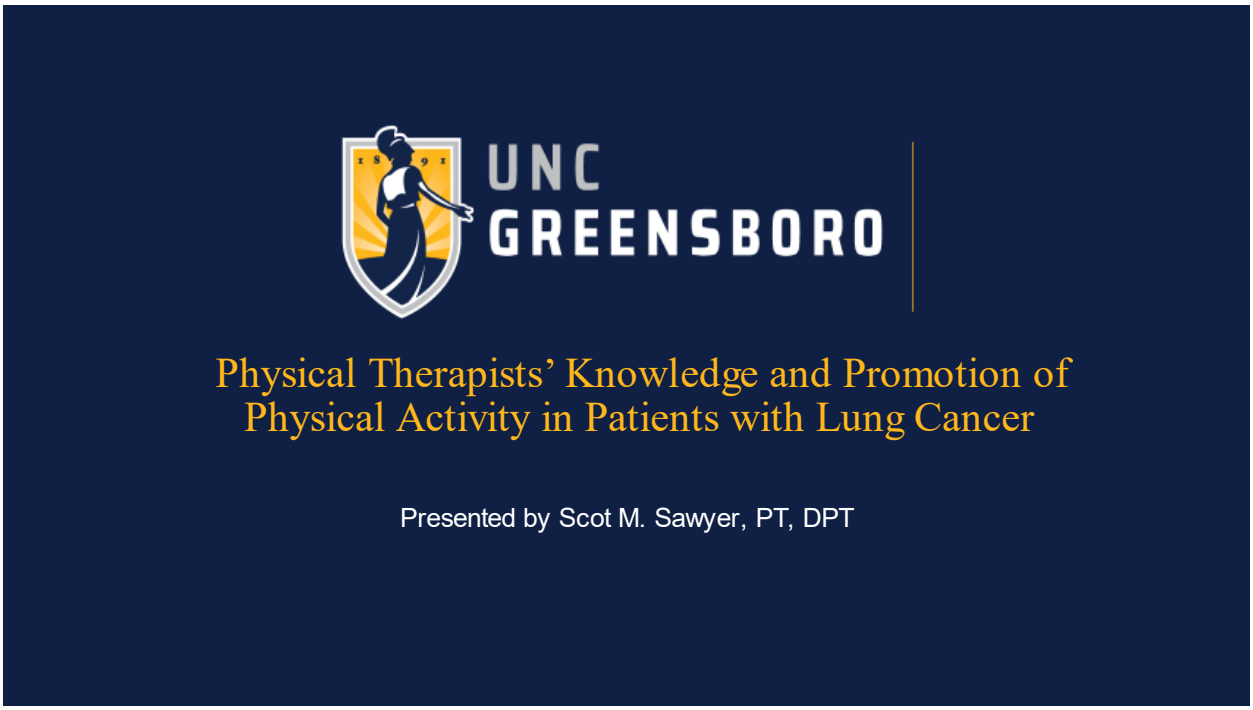
a. Strongly agree
b. Agree
c. Neither agree nor disagree
d. Disagree
3. Strongly disagree

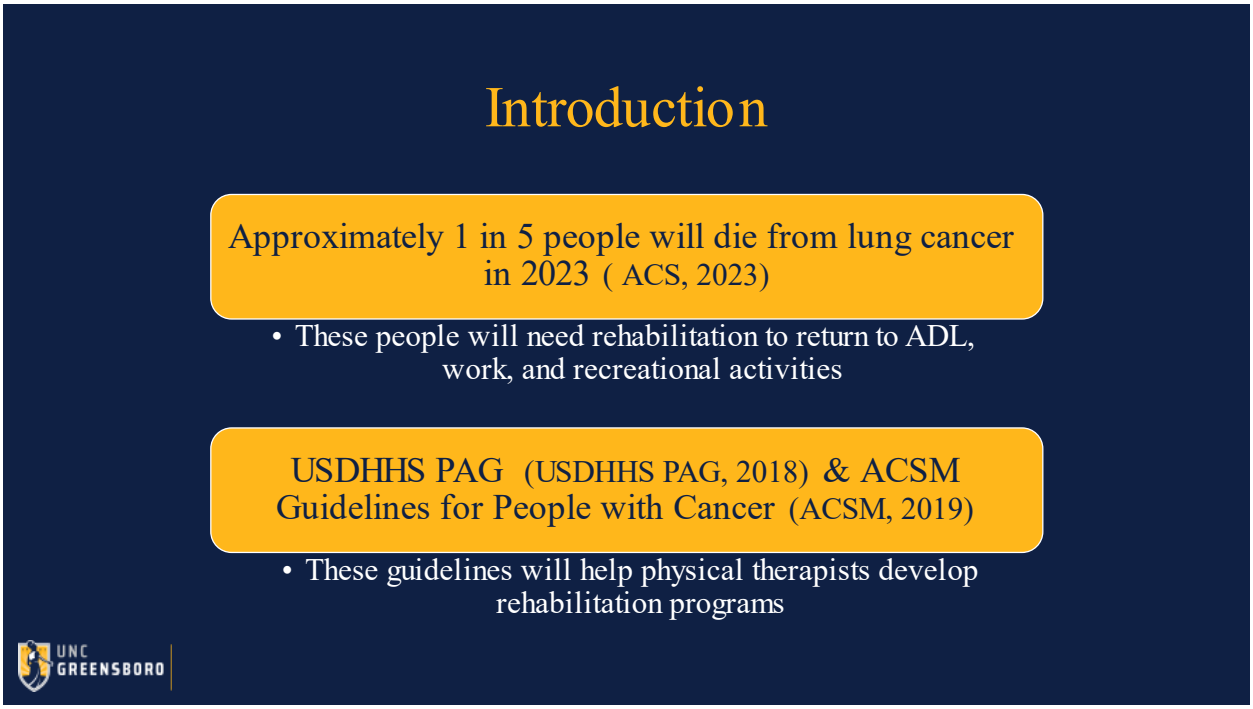
46. Which method below would be best for you to obtain more education pertaining to physical activity for people with lung cancer?

a. Online course
b. Workshop
c. Conference session
d. Other (open text box to specify)

47. Do you have any other information pertaining to your practice with patients who have lung cancer that you believe would be useful to this research study? (open text box for comments)

APPENDIX B: PRESENTATION SLIDES





Cancer Side Effects

Muscle strengthening as a component of PA provides benefits not found in aerobic activity. It can help prevent loss of muscle mass with bone metastases or age-related loss of muscle mass due to average of lung cancer at 65-70 years of age.

Hypertension is a major side effect of lung cancer and/or its treatment. It is easy to detect by taking blood pressure. Taking blood pressure pre and post any exercise is crucial to developing an appropriate exercise program using the FITT principle.

Greater than 70% of people experience cancer -related fatigue. It is often an overwhelming fatigue that does not abate with normal rest. It may take months or years to alleviate.

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Tools to Measure Cancer Side Effects

In measuring strength, the Five Times Sit to Stand Test (5XSTS) is good at functional strength assessment (Academy of Neurologic Physical Therapy, 2018).

To measure a cardiorespiratory response, you must take blood pressure pre and post exercise, the Six-Minute Walk Test (6MWT) is a time efficient method (Academy of Neurologic Physical Therapy, 2018).

Cancer related fatigue is easily measured with the Brief Fatigue Inventory (BFI) and give clues on types of activity that cause the greatest fatigue (National Institute of Health, 2021).

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Survey Questions on Promoting Physical Activity

Did therapists promote physical activity themselves to people with lung cancer?

Did therapistsuse community resources such as YMCA?

Did therapistsrefer people with lung cancer to othertherapistsor exercise professionals?

All three questions revealed that therapists who responded to the survey did not work with people who had lung cancer!

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Physical Activity Promotional Practices

Survey respondents had an option of writing what they did use for strategies to promote physical activity for people with lung cancer in a text box and three themes emerged

Direct Care
Proper breathing, energy conservation, muscle strengthening, & balance strategies

Referrals
Exercise physiologists, cardiopulmonary rehabilitation programs, community recreation, & YMCA

Education
Home exercise programs & YouTube videos

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Promotion of Physical Activity

Even though some therapists offered strategies in working with people who have lung cancer, none of the strategies offered are a stand-alone method. Ideally, a combination of strategies should be used and individualized to a person's goals and capabilities.

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Education

Finally, the survey asked questions on whether therapists would be willing to participate in education on how to work with people who had lung cancer and how would they like this education to be delivered?

Encouragingly, most therapists said YES, and they would like the education to be in an online format!

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APPENDIX C: RURAL NC CANCER CLINICS

Carolina East Medical Center
New Bern

Mission Hospital
Asheville

Frye Regional Medical Center
Hickory

Pardee UNC Health Care
Hendersonville

Watauga Medical Center
Boone

CaroMont Regional Medical Center
Gastonia

Cape Fear Valley Medical Center
Fayetteville

Catawba Valley Medical Center
Hickory

Columbus Regional Healthcare System
Whiteville

Davis Regional Medical Center
Statesville

Harris Regional Hospital
Sylvia