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The Lived Experience of Lung Cancer Patients With Psychological Health and Physical Activity

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Walden University
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Abstract

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MA, Maryland University of Integrated Health, 2016

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Health Psychology

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Abstract

Physical activity (PA) is recognized as a treatment protocol for lung cancer patients that improves physical impairments and reduces symptoms of psychological stress. This qualitative interpretive phenomenological analysis (IPA) study was conducted to explore the lived experience of lung cancer patients and how PA is influenced by anxiety, depression, and fatigue. This study was guided by Bandura's self-efficacy theory and Engel's biopsychosocial model. In-depth semi structured interviews were conducted with seven lung cancer participants over Zoom and in person. The data were analyzed using manual hand coding. The analysis revealed themes in patients' experiences about how PA participation is influenced by anxiety, depression, and fatigue: (a) lung cancer created fear and left patients feeling scared, (b) distractions and keeping busy is important, (c) increased anxiety left patients feeling unmotivated to be physically active, (d) increased anxiety left some patients determined to keep being physically active, (e) depression left some patients feeling challenged to participate in PA, (f) depression increased some patient's determination and persistence to keep physically active, (g) fatigue negatively influenced the desire to be physically active, and (h) fatigue can be overcome with persistence to be active. These results can assist individuals with lung cancer to understand the importance of PA and how anxiety, depression, and fatigue promote challenges, providing a framework for improving their PA levels. This study also promotes positive social change, as the results have implications for more substantial and more effective PA interventions to be created that support the different lifestyles of each lung cancer patient.

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Chapter 1: Introduction to the Study

Each year in the United States, over 235,000 people are diagnosed with lung cancer (American Cancer Society, 2021). Lung cancer patients face several challenges. Symptoms such as coughing and shortness of breath are common for individuals diagnosed with lung cancer and often results in psychological distress (e.g., depression, anxiety, fatigue; Eichler et al., 2018). For instance, perceived breathlessness in lung cancer patients can lead to the development of panic disorder (Lehto, 2017). Additionally, experiences of stigmatization and the potentiality of death can produce other mental health issues, increasing anxiety, depression, and fatigue (Agarwal et al., 2017).

Physical activity (PA) is increasingly becoming recognized as a treatment protocol for lung cancer patients that improves physical impairments and reduces symptoms of psychological distress (Lukez & Baima, 2020). PA, such as pulmonary rehabilitation, aerobic exercise, and resistance training, significantly reduces fatigue while improving the symptoms of dyspnea and depression (Henshall et al., 2019). PA can assist in achieving ideal body weight composition and increasing strength, mobility, and psycho-social well-being (Stefani et al., 2017). Although research has demonstrated that the relationship between PA and lung cancer is significant in relation to dealing with psychological distress (Agarwal et al., 2017; Eichler et al., 2018; Lehto, 2017), it is currently unknown how lung cancer patients perceive how PA benefits their mental health. Therefore, this study aimed to explore the lived experience of lung cancer patients on PA and how it can benefit their psychological health while improving symptoms of

anxiety, depression, and fatigue. With information about PA and its role in the treatment of lung cancer, there is the potential to inform health officials about the additional prevention, screening, and treatment efforts that PA can provide to this population to maintain or increase strong psychological health.

This chapter introduces the study by discussing the background of the study and identifying the problem statement that makes this research viable. Within this chapter, I also present the study's purpose and research questions and discuss the benefits of how this study will be best aligned with the conceptual framework of Bandura's theory of self-efficacy and the conceptual framework of Engel's biopsychosocial model. I conclude the chapter by defining commonly used terms that will be used throughout the research as well as discussing the study's assumptions, scope, delimitations, limitations, and significance.

Background

Studies have focused on lung cancer patients and what they can do to significantly improve their overall health-related quality of life and psychological health. In this section, I will discuss previous research that has concentrated on lung cancer and the following phenomena that will be presented in my study: (a) psychological health, (b) PA, (c) psychological distress, (d) anxiety, (e) depression, and (f) fatigue.

Lung Cancer and Psychological Health

Understanding psychological health and the quality of patients' lives is important when providing a complete overview of psychological distress (e.g., depression, anxiety, fatigue). Many factors have contributed to lung cancer patients being psychologically

unhealthy: (a) gender, (b) being of a younger age, (c) history of surgery, (d) employment status, and (e) medical insurance (Wang et al., 2017). Additionally, when patients demonstrated low levels of psychological resilience, they were more apt to experience lower levels of psychological health (Hu et al., 2018). Additionally, individuals with higher levels of stability showed stronger levels of social support and utilized their social support systems more readily (Hu et al., 2018).

Lung Cancer and PA

PA can alleviate the symptoms associated with lung cancer by increasing PA performance (Avancini et al., 2019; Lin et al., 2015). Increasing cardiorespiratory fitness, which refers to the respiratory and cardiovascular systems, can be a prognostic indicator of overall lung cancer mortality. PA requires bodily movements produced by the musculoskeletal system in response to PA that include recreational, structured exercise or participation in repetitive activities (Ferioli et al., 2018; World Health Organization [WHO], 2018). The recommended PA guidelines for individuals with cancer are 150 minutes of moderate to high-intensity PA and at least two to three sessions of strength and resistance training per week (Granger et al., 2018). A goal in lung cancer research and PA is to reach a consensus for universal recommendations on PA. Further, despite the evidence of PA's benefits in lung cancer as a non-pharmacological treatment, the timing to engage lung cancer patients in PA remains stagnant (Quist et al., 2018; Shukla et al., 2020). Determining PA guidelines, optimal design, and timing through research are still in the early study phases (Mainini et al., 2016).

Lung Cancer and Psychological Distress

Patients diagnosed with lung cancer report having increased distress levels (Ni et al., 2018), due to the initial shock of the diagnosis, during cancer treatment and the associated side effects, the persistent struggle with having a life-limiting disease, and experiences facing a progressive illness (Liao et al., 2018). Psychological distress causes physical and psychological hardships that include fatigue, nausea and vomiting, pain, and increased anxiety and depressive episodes (Granger, 2016; Ni et al., 2018). Psychological distress disrupts a patient's quality of life and interferes with cancer treatments and medical care received from clinicians (Tonsing & Vungkhanching, 2018). When coping with the disease, patients have reported that they relied on social support, focused on positive thinking styles, completed avoidance-based coping strategies, and followed a religious or spiritual path (Liao et al., 2018).

Lung Cancer and Anxiety

Although the initial shock of a lung cancer diagnosis is anxiety-provoking, anxiety can be seen as a considerable experience throughout the journey that a patient experiences when being diagnosed with their illness. Both anxiety and fatigue ae related to lower quality of life (Jung et al., 2018). However, recent studies have concluded that anxiety experienced after a diagnosis can predict the survival of patients. Psychosocial factors may play a significant role in reducing anxiety and increasing the odds of survival (Vodemaier et al., 2017).

Lung Cancer and Depression

Many lung cancer patients can experience depression. Individual risk factors for

experiencing depression include being younger than 50 years, being female, having a co-occurring coronary artery disease, and if a previous operation for lung cancer had been completed (Hung et al., 2017). The treatment of depression has significantly improved the quality of patients' lives even if it did not necessarily improve their chances of survival (Mulick et al., 2018). It is imperative to improve one's quality of life, and depression should be considered when moving through the journey of a lung cancer illness.

Lung Cancer and Fatigue

Past studies have focused on PA's impact on lung cancer patients. One study on 112 patients found no significant differences in fatigue improvement because the patients were unable to increase their PA regimens appropriately (Dhillon et al., 2017). Another study on 830 lung cancer survivors showed that fatigue exerted stronger influences on the lives of lung cancer patients and their health-related quality of life (Jung et al., 2018). Therefore, focusing on fatigue is essential as this phenomenon appears to influence health-related quality of life negatively, more than depression and anxiety.

Relevance Of Study

PA can assist in achieving ideal body weight composition as well as increasing strength, mobility, and psycho-social well-being (Stefani et al., 2017). However, it is unknown how PA can be beneficial in addressing psychological health and any instances of anxiety, depression, or fatigue when experienced by lung cancer patients. Determining PA guidelines, optimal design, and timing through research are still in the early study phases (Mainini et al., 2016). This study is needed to understand better how PA

influences the psychological health of lung cancer patients and how it can affect the individuals' level of anxiety, depression, and fatigue.

Problem Statement

Individuals experience anxiety, depression, and fatigue after receiving a lung cancer diagnosis, reducing their psychological health and health-related quality of life (Eichler et al., 2018). Furthermore, individuals diagnosed with lung cancer experience symptoms such as coughing and shortness of breath, which increase levels of anxiety, depression, and fatigue (Lehto, 2017). PA is significant for dealing with psychological distress from lung cancer (Agarwal et al., 2017; Eichler et al., 2018; Lehto, 2017); however, it is currently unknown how patients experience PA as being beneficial to their mental health (Mainini et al., 2016). In lung cancer research, the least understood aspect of treatment is how PA is influenced by anxiety, depression, and fatigue. Despite evidence that people with cancer can safely perform moderate to high-intensity PA (Bade et al., 2018; Timmerman et al., 2018), many patients do not adhere to or meet the recommended guidelines (Granger et al., 2018). Understanding how patients perceive their lived experience on how PA may influence their psychological health outcomes can decrease anxiety and depression in conjunction with the improvement of fatigue (Vainshelboim et al., 2019; Yin et al., 2016). Given the low survival rates among lung cancer patients, understanding the preventive effects of PA in lung cancer and its impact on anxiety, depression, and fatigue has important public health implications for future screening and treatment of lung cancer (Vainshelboim et al., 2019).

Purpose of the Study

The purpose of this qualitative interpretive phenomenological analysis (IPA) study was to explore the lived experience of patients diagnosed with lung cancer on how PA is influenced by anxiety, depression, and fatigue. In lung cancer treatment, implementing PA can lead to increased long-term health benefits (e.g., perceived psychological health and physical health) associated with PA performance (Payne et al., 2018; Rutkowska et al., 2019). Therefore, it is important to understand how PA for lung cancer patients influences psychological health while decreasing anxiety, depression, and fatigue.

Research Questions

The overall research question was "What is the lived experience of lung cancer patients with the impact of psychological health on PA?" The following research questions were addressed through this study:

- RQ 1: How is PA influenced by anxiety?
- RQ 2: How is PA influenced by depression?
- RQ 3: How is PA influenced by fatigue?

Conceptual Frameworks for the Study

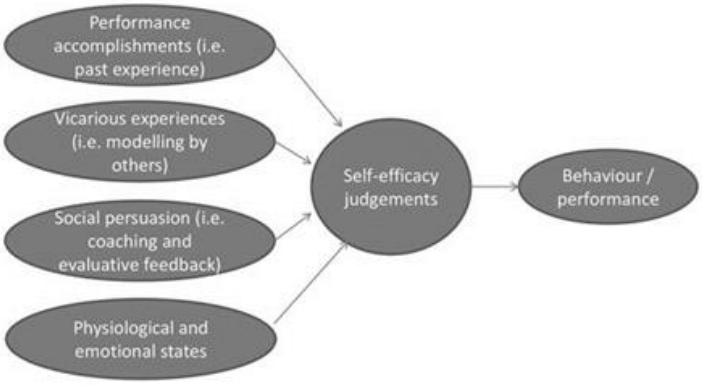
This study was guided by Bandura's self-efficacy theory and Engel's biopsychosocial model. Self-efficacy is an individual's belief in how well they can succeed in a specific situation (Bandura, 1977; Huang et al., 2018; Saetan et al., 2020; Séguin Leclair et al., 2021; Wise & Trunnell, 2001). According to the theory, individuals experience four constructs to develop self-efficacy:

1. Vicarious experiences
2. Physiological feedback
3. Verbal persuasion
4. Performance outcomes

Figure 1 highlights Bandura's theory of self-efficacy, demonstrating how the four constructs are related to individuals' behaviors and performances (Bandura, 1977; Saetan et al., 2020). In this study, individuals who have been diagnosed with lung cancer examined past experiences (e.g., past experiences with illnesses), vicarious experiences (e.g., modeling behavior by other lung cancer patients), social persuasion (e.g., coaching and feedback from the medical team), and their physiological and emotional states (e.g., anxiety, depression, and fatigue). The behavior and performance component of the self-efficacy theory included a patient's PA level. Therefore, this theory is in alignment with the research questions that guide this study, as they are focused on the behavior of PA in relation to anxiety, depression, and fatigue, recommendations for treatment from healthcare providers, modeling other lung cancer patients' experiences, and reflecting on their past experiences with illness or disease.

Figure 1

Bandura's Theory of Self-Efficacy



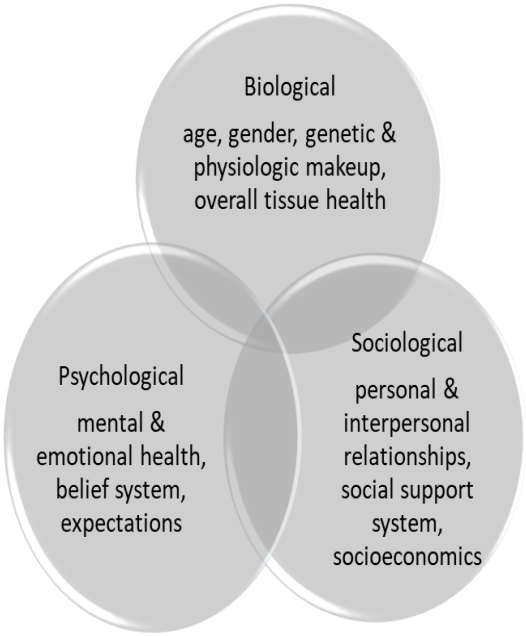
The biopsychosocial model (BPSM) was introduced by George Engel for a more holistic model to address the causes of disease, determine prevention strategies, and learn management techniques for living with illness (Bolton & Gillett, 2019; Engel, 1977; Suls et al., 2019). The BPSM considers the whole person through the biological and psychological lenses and considers the individuals' social and environmental factors involved in the development of disease (Suls et al., 2019). The mind and body are pervious to one another, and the biological organism is pervious to the psychological and social complexities of interactions within the realm of health.

Figure 2 highlights Engel's BPSM (Rosen, 2020), displaying the connection between the biological, psychological, and social factors that affect how individuals experience the disease process. The BPSM considers the qualitative aspects of human experiences, including thinking processes, belief systems, and behavioral responses. Biological processes are directly affected by social and environmental circumstances

(Turabian, 2018). The BPSM focuses on patient-centered care to understand the patient's experience with the illness according to the signs and symptoms presented but also on the psychological and social context of the environment in which the patient lives. A patient-centered method of care allows the clinician to observe the patient's world, formulate a holistic view of their experience, and support the patient into taking responsibility for their health and managing their disease (Larivaara et al., 2001; Turabian, 2018).

Figure 2

George Engel's Biopsychosocial Model



Nature of the Study

This study followed a qualitative method with interpretive phenomenological analysis (IPA). A qualitative approach was selected for this study because qualitative research is used to gain a deep understanding of a phenomenon, and I aimed to explore

lung cancer patients' lived experience on how PA is influenced by anxiety, depression, and fatigue (see Creswell & Poth, 2016; Peat et al., 2018). This could not have been achieved by following a quantitative method because the aim of quantitative research is to determine relationships via statistical, mathematical, and computational techniques. (Fryer et al., 2018).

There are many benefits of IPA research, including the ability of the researcher to make sense of complex and emotionally charged topics (Peat et al., 2018; Smith & Osborn, 2015; Tuffour, 2017). Additionally, IPA benefits this study because this form of design allows researchers to explore the lived experience of participants, highlighting their worldviews (Creswell & Poth, 2016; Peat et al., 2018). Furthermore, IPA allowed me to better understand the lived experience of lung cancer patients on their terms, providing me with a rich dataset (see Tuffour, 2017). This study focused on male and female adults who are 40 years or older with lung cancer. The data for this study were collected using semi structured interviews where the participants were asked the same open-ended questions they could answer in any manner they saw fit. The semi structured interviews were conducted via Zoom video conferencing and one-on-one interviews that followed social distancing rules to align with the Center for Disease Control and Prevention's (CDC) social distancing guidelines in response to the COVID-19 pandemic.

Definitions of Terms

Anxiety: Anxiety is a nervous disorder that is characterized by a state of excessive uneasiness and apprehension, typically with compulsive or behavioral panic attacks (American Psychiatric Association, 2021).

Depression: A mental health disorder characterized by a persistent depressed mood or loss of interest in activities causing significant impairment in everyday life (American Psychiatric Association, 2021).

Distress: Distress in lung cancer comes in physical symptoms that include gasping for breath, coughing, and fatigue that often leads to psychological distress, including increased anxiety and depression (Krebber et al., 2017; Yorke et al., 2015).

Fatigue: Fatigue is defined as feelings of tiredness, exhaustion, or a lack of energy (Kessels et al., 2018). In this study, fatigue could be experienced as a symptom of cancer itself or as a side-effect of a treatment regimen (Ebede et al., 2017).

Physical activity (PA): PA consists of events, whether recreational, repetitive, or planned, requiring the body's skeletal muscles to create the movements while expending calories to generate muscular energy (Ferioli et al., 2018; WHO, 2018).

Psychological health: Difficulties managing emotional health and the experience of unpleasant feelings. Distress that negatively disrupts health-related quality of life and limits an individual's ability to cope with the challenges in life (Gudenkauf et al., 2019).

Assumptions

Several assumptions are inherent in this study. One assumption is that the participants answered each of the semi structured interview questions honestly, candidly, and straightforwardly. Another assumption is that the participants have the lived experience to answer the open-ended questions effectively. Another assumption is that participants who volunteered for this study did not intentionally bias the results. There is also an assumption that the participants understood the informed consent and provided

accurate responses to the interview questions. These are necessary assumptions to identify the reliability of the study's research questions.

Scope and Delimitations

This study aimed to explore the lived experience of lung cancer patients and how PA is influenced by anxiety, depression, and fatigue. The study's scope was limited to recruiting lung cancer patient volunteers with lung cancer who are 40 plus years of age. Participants were contacted via an online application called ResearchandMe.com. ResearchandMe.com aims to connect participants to researchers around the United States. The online application sent out information to participants who are registered on their site to let them know of studies that are occurring within their area. Data were collected using semi structured interviews over Zoom. The results from this study are generalizable to lung cancer patients. Future researchers may replicate this study's results upon publication as a dissertation through Walden University and apply them to other populations.

Limitations

Limitations are inherent in the research methodology, design, and potential biases of this study. One of the main limitations is researcher bias. Researcher bias can occur when the researcher allows their personal perspectives, as well as their thoughts, values, and opinions into the study (Gao, 2020). To reduce researcher bias, I developed an interview protocol reviewed by a panel of experts to ensure that the questions are in alignment with the study's problem, purpose, research questions, conceptual frameworks, and methodology. The panel of experts consisted of three individuals whom I do not

know on a personal level and who have similar professional and educational experiences as myself. After reviewing the semi structured interview questions, the panel members did not recommend any changes to be made to the questions to bring them in stronger alignment. Another way that I dealt with researcher bias was by completing member checking. Member checking is a process where I had the participants of the study review the transcripts of their interviews to ensure that they are reflective of exactly what was said (see Candela, 2019; Rose & Johnson, 2020). If any participants had reported inaccuracies in the interview transcripts, I would have made their recommended changes.

Significance of the Study

The significance of this study includes providing an improved understanding of how lung cancer patients perceive PA and how it is influenced by anxiety, depression, and fatigue. This study has the potential to make a direct impact on clinical practice in cancer care (Avancini et al., 2020; Cavalheri et al., 2013), informing oncologists, physicians, and exercise specialists on how PA influences psychological health and how it can help them to decrease levels of anxiety, depression, and fatigue when designing intervention protocols in lung cancer treatment. PA may help with coping strategies regarding the psychological and physical health of those facing the progressive illness. Patients who participate in PAs have demonstrated increases in both psychological and physical health which can be a prognostic indicator of overall lung cancer mortality. Therefore, given the low survival rates among lung cancer patients, understanding the preventive effects of PA in lung cancer and its impact on anxiety, depression, and fatigue has important public health implications for future screening and treatment of lung cancer

to increase their overall quality of life (Vainshelboim et al., 2019).

Summary

Individuals experience anxiety, depression, and fatigue after receiving a lung cancer diagnosis, which reduces their levels of psychological health and health-related quality of life (Eichler et al., 2018). Therefore, the purpose of this qualitative interpretive phenomenological analysis (IPA) study was to explore the lived experience of lung cancer patients on how PA is influenced by anxiety, depression, and fatigue. It demonstrated the potential influences between PA and anxiety, depression, and fatigue. Understanding how PA influences psychological health for lung cancer patients, can have increased positive outcomes in this population's treatment. Chapter 1 provided an overview of the background for this study. This chapter then presented the research questions and discussed the self-efficacy theory and the biopsychosocial model. Chapter 1 concluded with a discussion on the nature of the study, the scope and delimitations, the significance, and limitations.

Chapter 2 will provide a more comprehensive overview of the self-efficacy theory and the biopsychosocial model. The chapter also reviews PA's existing literature in the treatment of lung cancer and its effect on psychological health. Additionally, I discuss PA's role in the treatment of lung cancer, examining the influence between PA implementation and increased psychological health while decreasing anxiety, depression, and fatigue.

Chapter 2: Literature Review

The purpose of this qualitative interpretive phenomenological analysis (IPA) study was to explore the lived experience of patients diagnosed with lung cancer on how PA is influenced by anxiety, depression, and fatigue. The phenomenon explored in this study included the implementation of PA engagement in lung cancer and the lived experience with anxiety, depression, and fatigue. In lung cancer treatment, indicating how PA is influenced by anxiety, depression, and fatigue, can lead to increased long-term health benefits (e.g., perceived psychological health and physical health) associated with PA performance (Payne et al., 2018; Rutkowska et al., 2019). It is important to understand the link between improved psychological health and decreased anxiety, depression, and fatigue levels.

Literature Search Strategy

In completing this review, I sourced materials published within the last 5 years from central databases, including but not limited to databases accessed through Walden University Library, EBSCOhost, PubMed, Science Direct, Google Scholar, and WHO library. I also included some grey literature and seminal works published before 2016 to better understand the literature concerning PA and lung cancer today. Keywords used included *effects of PA on cancer, PA and cancer, PA performance and lung cancer, lung cancer, lung cancer and anxiety, lung cancer and depression, PA and cancer, PA and lung cancer, PA, and lung cancer treatments, and PA and fatigue in lung cancer, self-efficacy and PA, self-efficacy in cancer, biopsychosocial model,* and *biopsychosocial model in cancer.*

Conceptual Framework

The chosen conceptual frameworks for this study are the self-efficacy theory and the biopsychosocial model. Self-efficacy is an individual's belief in how well they can succeed in a specific situation (Bandura, 1977; Huang et al., 2018; Saetan et al., 2020; Séguin Leclair et al., 2021). According to the theory, individuals experience four constructs in developing their self-efficacy levels: vicarious experiences, psychological feedback, verbal persuasion, and performance outcomes (Saetan et al., 2020; Wise & Trunnell, 2001).

Self-Efficacy Theory

Bandura constructed the self-efficacy theory not specifically for understanding the behaviors and beliefs of people with cancer but to reveal insightful processes and strategies that can affect a person's belief in their own ability to engage in a health-promoting behavior, not necessarily exercise. However, the theory can certainly be used in the study's context. Researchers like Keefer et al. (2003) and Ulrich et al. (2018) conceptualized increased self-efficacy for people with chronic diseases as a lifetime task that requires not just knowledge and skills but cognitive processes and beliefs that can lead to sustainable behavioral changes. Patients should have elevated levels of self-efficacy to undertake the behavioral modifications they are asked to make. Studies focused on lung cancer patients have also used this conceptual lens to arrive at their findings. For example, Yang, Zhong et al. (2018) used self-efficacy theory to show that specific treatments or management strategies designed for lung cancer can effectively be implemented if the patient's undergoing intervention have increased motivational

behaviors, built upon a healthy level of self-efficacy. Saetan et al. (2020) also used the theory to assess the effects of a specific respiratory rehabilitation program on the dyspnea of patients with lung cancer and showed that perceived self-efficacy is crucial for such a program to work.

Biopsychosocial Model

George L. Engel is the leading proponent of the biopsychosocial model of health and illness. According to Engel (1977), how the biological, psychological, and social factors surrounding a person interact with each other impact the cause, presentation, and outcome of certain diseases and health care treatments (Frazier, 2020; Gask, 2018; Wade & Halligan, 2017). Engel claimed that people's genetic makeup (biology) would have to interact with mental health and behavior (psychology) and be affected by their social and cultural milieu in determining their health-related results (Wade & Halligan, 2017). Mental health issues do not fulfill the standard biological-biomedical model's needs (Deacon, 2013; Lebowitz & Appelbaum, 2019). For example, having a relative with schizophrenia could be a significant, if not the biggest, risk factor for developing the disease (risk is 6.5%; Chen et al., 2018; Gutkevich, 2017; Koethe et al., 2019). Some studies have revealed that over 40% of monozygotic twins of people with schizophrenia are also likely to be at risk of developing it. Some studies showed that having one parent with this condition raises a child's risk by approximately 13%; if both parents are affected, the risk rate can jump to as high as 50% (de Zwarte et al., 2019; Tang et al., 2017). In people with an already inherent genetic risk, some non-biological factors, such as environmental factors, could further aggravate the disorder's manifestation (Chen et

al., 2018; Stilo & Murray, 2019).

The biopsychosocial model's psychological component considers the impact of psychological factors. Based on this theory, even though individuals with a genetic vulnerability are at more significant risks or more inclined to engage in negative thinking and suffer depression, psychological variables may compound this biological tendency (Frazier, 2020; Gask, 2018; Wade & Halligan, 2017). These variables can mainly expose a genetically sensitive individual to other risk behaviors. Depression, for example, may not cause liver damage on its own, but it can lead to behaviors that would such as abusing alcohol. Increased risk-taking linked to psychological disorders or factors has also been linked to a higher risk of diseases (Frazier, 2020; Gask, 2018; Wade & Halligan, 2017).

The theory also considers the individual's socioeconomic position, culture, technology, and religion. For example, losing a job or quitting a romantic relationship might result in stress and disease. These life circumstances may not be the main reasons behind a condition, but they predispose a person to depression, which can cause physical health issues. Other trajectories can also happen (Frazier, 2020; Gask, 2018; Wade & Halligan, 2017). Lack of income, for instance, can propel a person not to eat healthily or forgo health checkups, thereby increasing their risks of developing certain diseases. In mental illnesses such as anorexia nervosa, the impact of social variables is well covered. This disorder, described as an obsession with subsequent excessive weight loss despite evidence of already low body weight, is affected by social environment. In particular, the media and the fashion industries are the culprits as they promote an unhealthy beauty standard that places a premium on thinness over health (Sobal, 2017). Despite the

apparent health hazards, this creates social pressure to achieve this perfect body image. Other social factors, such as peer pressure or romantic notions, can be at work (Sobal, 2017).

Cultural influences are also considered a social variable. Distinct cultural groups, for example, have varying prevalence rates and symptom expressions of diseases due to variances in their circumstances, expectations, and belief systems. Anorexia, for instance, is less common in non-Western societies because they place less importance on women's thinness (Frazier, 2020; Gask, 2018; Wade & Halligan, 2017). Culture can alter dramatically throughout a narrow geographic range, such as from low-income to high-income places, and disease and illness rates vary accordingly. As epigenetics research is beginning to reveal, culture may even modify biology. Epigenetics research in particular shows that the environment can change a person’s genetic makeup. According to studies, individuals exposed to overcrowding and poverty are more likely to acquire depression, with genuine genetic changes emerging over only a single generation (Frazier, 2020; Gask, 2018; Wade & Halligan, 2017).

According to the biopsychosocial paradigm, the body, mind, and environment all impact each other. None of these characteristics alone can determine whether someone is healthy or sick; instead, the complex interrelationship of all three leads to a specific outcome (Frazier, 2020; Gask, 2018; Wade & Halligan, 2017). The central assertion made in this theory is that in promoting positive health, all three factors must be considered. The patient’s health status, perceptions of health, and sociocultural barriers to accessing health care all influence the chances of a patient engaging in health-promoting

behaviors such as taking prescribed medicines, eating a healthy diet, and participating in PA (Frazier, 2020; Gask, 2018; Wade & Halligan, 2017). The biopsychosocial model is essential for identifying the phenomena that account for the most variance in quality of life and thus serves as an appropriate conceptual framework for this study.

Literature Review Related to Key Concepts

Lung Cancer Realities

Lung malignancies are the leading cause of cancer-related deaths. Even though progress has been made significantly in diagnostic and therapeutic methods, the overall prognosis remains relatively poor for patients with lung cancer. Non-small cell lung cancer (NSCLC) as well as small cell lung cancer (SCLC) are the two main histological subtypes of this deadly disease, and the former accounts for as high as 85% of all the cases (Duma et al., 2019; Liu et al., 2017; McIntyre & Ganti, 2017; Murlidhar et al., 2017; Yang, Chang et al., 2018). The overall survival by clinical stage, 6 to 60 months, can range between 97% and 92% for patients at the first and second stages but can decrease to 10% to 0% of patients at the more advanced stages (Duma et al., 2019; Liu et al., 2017; McIntyre & Ganti, 2017; Murlidhar et al., 2017; Yang, Chang et al., 2018).

Despite the existence of targeted therapy and the sophistication of immunotherapy, factors continue to influence patients' quality of life negatively. Even though progress has been made concerning the availability of innovative treatments, lung cancer still involves physical, psychological, and social difficulties. The range of cancer as well as treatment-related complications, not limited to dyspnea, muscle waste, extreme pain, unusual fatigue, and exhaustion, as well as loss of appetite, and overall deterioration

of physical fitness apart from the decline in lung function, can make a patient with lung cancer feel hopeless (Bye et al., 2017; Rutkowska et al., 2021; Herbst et al., 2018; Yuan et al., 2019).

Even though there is not rigor on this research topic, lung cancer outcomes have been suggested to be relieved through PA. There is a lack of dedicated guidelines for administering PA for those with lung cancer; however, there are enough studies on other types of cancers that support PA and moving to help a person with lung cancer improve their fitness and quality of life (Bye et al., 2017; Rutkowska et al., 2021; Herbet et al., 2018; Yuan et al., 2019). Studies on other cancers have shown this could be an essential factor, which makes it necessary to be assessed in lung cancer cases.

Lung Cancer and Depression

The connection between cancer and mental health when receiving lung cancer treatments and surviving is associated with fatigue, anxiety, and depression. The mood of anyone diagnosed with cancer is likely to be unpredictable and negative (He et al., 2020; Liu et al., 2018; McFarland et al., 2020; Signorelli et al., 2020). Patients with lung cancer could have unpredictable moods and are significantly affected by the treatment processes they must go through (Hu et al., 2018). The quality of life of lung cancer patients is generally low, but it is significantly worse among those with anxiety and depression (Polanski et al., 2017). But resilience could serve as a partial mediator in the relationship between anxiety and emotional support, and it is a total mediator in the relationship between support utilization and anxiety (Hu et al., 2018). Psychological screening and contiguous interventions are crucial to advanced cancer care (Choi & Ryu, 2018).

Risk factors for Depression

A meta-analysis of 25 studies showed that depression was significantly associated with overall cancer risks (Jia et al., 2017). Patients with stage IV non-small-cell lung cancer (NSCLC) have a higher risk of depressive symptoms and major depressive disorder (MDD), though those with epidermal growth factor receptors (EGFR) could have a lower risk of these symptoms (Jacobs et al., 2017). Those lower than 50 years of age, female, those with coronary artery disease, and those who have undergone operations and had high incidences of emergency room visits and admissions have had an elevated risk of depression (Hung et al., 2017). Women with the highest level of depressive symptoms have been shown to have the most elevated lung cancer risk (Trudel-Fitzgerald et al., 2020). Lung cancer patients are also known to be mostly nutritionally deficient, especially when they are already in advanced and metastatic cancers. This can indirectly affect the mental condition of the patients in addition to the level of pain they experience, with research showing 65% of a sample of 257 patients who suffered from depression and anxiety (Chabowski et al., 2018). Fatigue can further lead to borderline depression and anxiety, as fatigue can lead to low physical, role, emotional, cognitive, and social functioning (Jung et al., 2018). Thus, is a need to provide early supportive psychotherapy or pharmacological interventions to patients (Chabowski et al., 2018).

Possible Treatment for Cancer That Could Affect Mental Health

Though lung cancer carries a high prevalence of distress (anxiety and depression), new treatments have emerged targeted at combating cancer cells, even though their

psychological associations have not been given much attention. New treatments, which included targeted therapy and immunotherapy, have been shown to effectively change the disease course for the subsets of lung cancer patients and hinted at the possibility of more prolonged survival (McFarland, 2019). These new treatments remain significantly linked to specific psychological issues but are lower than traditional chemotherapies. Therefore, new immunotherapy and targeted therapies could lead to less depression and inflammation among patients living longer, even if the pain and other physical symptoms they are experiencing are relatively maintained.

PA as a Moderator for Depression

Lung cancer survivors can also benefit significantly from PA interventions. Most studies have shown that PA interventions could significantly reduce fatigue, dyspnea, and depression. PA interventions commonly offered to lung cancer survivors include pulmonary rehabilitation, aerobic exercise, resistance training, and balancing programs (Henshall et al., 2019). Such physical interventions are unlikely to cause harm for lung cancer survivors. But more rigorous study designs are beneficial for providing guidance about which interventions can help lung cancer survivors manage their health and even remaining symptoms by themselves (Henshall et al., 2019).

Lung Cancer and Anxiety

Researchers, extensive population-based studies involving patients with non-small cell lung cancer (NSCLC) analyses confirmed that apart from depression, lung cancer patients must contend with solid anxiety (Mou et al., 2020; Williamson et al., 2020; Yanlin et al., 2020). By demonstrating evidence of the vital link between anxiety and

mortality of patients with lung cancer, the researchers validated the idea that disease progression can be tempered through psycho-social factors (Mou et al., 2020; Williamson et al., 2020; Yanlin et al., 2020). Because emotional distress is linked with continued smoking, smoking is another pathway that researchers have revealed between having anxiety and higher mortality due to lung cancer. One of the main components of treating lung cancer patients is the complete cessation of smoking, anxiety-led smoking undermines this aspect of the treatment. Therefore, psychological interventions cannot be undermined about their influence on the length and chances of survival among lung cancer patients.

Vodermaier et al. (2017) evaluated whether anxiety and depression can lead to higher mortality rates among patients with lung cancer. Gathering data from 684 patients with lung cancer who were routinely assessed for anxiety and depression through the Psychosocial Screen for Cancer questionnaire before receiving treatment, the researchers found that only anxiety and not depression were linked to increased lung cancer-specific anxiety as well as all-cause mortality. In addition, Jankowska-Polańska et al. (2019) evaluated the impact of cognitive adjustment on cancer, measured through the pre-existing tools, the Mini-Mental Adjustment to Cancer (mini-MAC) scale, and the Hospital Anxiety and Depression Scale. Data were gathered from 185 patients, grouped according to how they coped with their diseases, based on scores in the mini-MAC. The patients were categorized into three types of coping strategies, constructive coping, balanced coping, and destructive coping strategies. Results showed that patients with predominantly destructive coping strategies are generally more anxious than those who

practice the balanced or constructive coping strategies. The same findings hold for those with depression. Patients are likely to have depression if their coping mechanisms are destructive instead of balanced or constructive.

Rutkowski et al. (2017) conducted a prospective study to assess the level of anxiety, depression, and quality of life among patients with early-stage NSCLC who cannot be operated on medically. They are instead treated with stereotactic ablative radiotherapy (SABR). According to the researchers, extended survival is always desired for people with lung cancer or any cancer type. However, it is also essential to maintain a high quality of life and good psychological function when a patient is being administered lung cancer treatment. In the modern period, SABR has significantly changed how clinical care is provided and patient outcomes among inoperable patients. In this study, 51 patients were asked to complete questionnaires on their quality of life, lung cancer, anxiety, and depression. These questionnaires were repeated for two weeks after the patients completed their treatments and one more time after three months. This study showed that SABR did not deteriorate the quality of life and the psychological functioning of the patients.

Contrary to hypothesized, clinically meaningful improvements were observed among the patients concerning their emotional functioning, insomnia rates, anxiety, and depression levels. Patients with chronic obstructive pulmonary disease, however, showed significantly lower improvements in comparison. The study confirmed that SABR is relatively well-tolerated by patients with lung cancer and does not lead to a delirious effect on the quality of life and psychological state. Results of the study also showed that

additional psychological care is crucial for patients with COPD.

Through the years, lung cancer has been increasingly described as a lifestyle disease, as opposed to other types of cancers. Unfortunately, despite it being a lifestyle disease, it is not easy to treat. Instead, it has an abysmal prognosis compared to other cancer types. Radical surgical treatment has been perceived as the first-choice treatment among patients with earlier stages of lung cancer, such as lobectomy and lymphadenectomy. However, as more studies are conducted, results revealed that these approaches have their dangers. They place patients at high risk of severe toxicity, for one. This means that certain patients with lung cancer are worse off if they receive these treatments, particularly those of older ages. Due to an aging population globally, around 20% of those patients in stage one, are already medically ineligible to be given surgery. Increased risk of treatment-related complications renders such treatments dangerous for elderly patients and, therefore, not acceptable. As such, elderly patients diagnosed with lung cancer are given instead best supportive care (BSC) as their only treatment option as it is construed as not hurting patients' quality of life. Unfortunately, BSC is found not to have any effects on the survival rates of patients with lung cancer, which deems it unattractive. Some older people pursue treatments because they want to live longer, and if that cannot be guaranteed, they find BSC of no value, even though this is not necessarily true. In recent years, the SABR technique has increasingly become attractive because of its low toxicity rate and acceptable tolerance rate.

Fang and Liu (2021) determined the risk factors linked with anxiety and depression among young lung cancer patients. These conditions are psychiatrist-

confirmed, as opposed to self-reported. Usually, identifying these risks can be deemed too difficult to do because the incidence and prevalence rates are much lower than middle-aged and elderly patients, making logistic regression not effective in successfully identifying risk factors. The researchers sought to change this. The researchers gathered data from 1022 lung cancer patients between 20 and 29 years of age using a national database. To determine the risk factors that past studies could not ascertain, the researchers used a novel algorithm that incorporated a k-means clustering method. The researchers found significant factors associated with anxiety and depression, thought to be rare among young lung cancer patients compared to older ones. The findings concluded that psychiatrists need to be as involved as the cancer doctors at the early stage of initial diagnosis with lung cancer for young patients. They are crucial for handling the possible psychological effects of being diagnosed with cancer, such as providing the right type and number of prescriptions of antipsychotic medications for young patients dealing with the disease that has an extremely poor prognosis.

The reason why psychological distress (e.g., anxiety, depression, fatigue) needs are taken into consideration when caring for patients with lung cancer is that psychological distress is linked to poorer functioning and reduced quality of life among patients with advanced cancer. This can, in effect, lead to even poorer physical health and demotivation to continue with treatment. These factors can lead to haphazard treatment decisions and destructive coping strategies that can further make survival impossible. In a study by Fischer et al. (2018), patients with different types of cancer, such as advanced colorectal, gastrointestinal, lung, and melanoma cancers, were asked to complete

measures on anxiety, depressive symptoms, optimism, and hope. The researchers then gathered predictions for 12-month survival for each of the patients, based on data provided by the oncologists. The researchers also gathered the performance status of each patient. Results showed that more minor depressive symptoms could be brought about by having higher levels of hope than optimism, even if the two constructs seem the same.

On the other hand, optimism was associated with less severe anxiety symptoms as opposed to hoping. The findings concluded that both hope, and optimism are crucial for alleviating depression and anxiety risks among patients with cancers, including advanced lung cancers. Hope and optimism are both associated with different aspects of psychological distress among patients living with advanced stages of cancer. The level of hope and optimism that a patient needs depends on the different appraisals of the uncertainty they feel about their health.

The relationship between cancer outcomes and the patient's depression and anxiety status has been rigorously studied. However, it remains too complicated to thoroughly understand the mechanisms linked between the disease and the psychological state. Wang et al. (2020) created a study to quantify the link between depression and anxiety defined through symptom cakes or clinical diagnosis and the risk of cancer-related factors, particularly cancer incidence, cancer-specific mortality rates, and all-cause mortality in patients diagnosed with cancer, including lung cancer. Statistical analysis of 51 cohort studies that, in effect, included 2,611,907 participants, strongly showed that depression and anxiety were associated with a significantly increased risk of cancer incidence. Not only that, negative psychological states, are also linked with

cancer-specific mortality and all-cause mortality among cancer patients. Subgroup analyses provided more critical insights. The findings demonstrated that clinically diagnosed depression and anxiety have a negative impact on cancer incidence, survival, and mortality because of psychological distress, which is a common symptom between depression and anxiety. The findings, however, revealed that while psychological distress can lead to higher cancer-specific mortality and overall cancer survival, it does not function as a predictive variable behind cancer incidence. Its impact is more on when a patient has already been diagnosed with cancer. The site-specific analysis revealed that overall, the two psychological conditions of depression and anxiety could lead to higher incidence risks for diverse types of cancer, lung included, and an increase in all-cause mortality rate among those who have already been diagnosed with cancer.

Lung Cancer and Fatigue

Lung cancer has long been researched in relation to fatigue. Due to the experiences of lung cancer symptoms, as well as the types of treatments that patients receive, fatigue can be a debilitating phenomenon for many individuals (Dhillon et al., 2017). Cheng et al. (2017) reported fatigue that is experienced by lung cancer patients is difficult for both patients and case workers to manage. Therefore, the authors completed a study that focused on how to address fatigue within lung cancer patients. The author completed a double-blind study where they aimed to understand how acupuncture influenced fatigue experienced from lung cancer. Collecting data from 28 lung cancer patients who reported fatigue due to their cancer diagnosis, the authors placed the participants into two groups; one group acted as the experimental group and the other

group acted as the control. The participants were provided treatment two times per week for a total period of four weeks and the authors found some surprising results. The results of the study indicated that the participants who were in the experimental group experienced a reduction in their fatigue scores, demonstrating that acupuncture could be a positive experience to reduce fatigue in lung cancer patients.

Henshall et al. (2019) completed a literature review synthesis that aimed to understand lung cancer fatigue in relation to PA regimens. The authors reported that although lung cancer survival rates are increasing, PA regimens can help improve fatigue. The authors also cautioned that there are little studies that demonstrate this, which was the basis of their current review. Collecting data from research articles between the years of 2000 and 2017, the authors retrieved over 850 records and found some interesting results. The results of the literature review synthesis highlighted that PA regimens may be beneficial to lung cancer patients and unlikely to provide any harm; however, the authors cautioned that there are limited studies in this area. Within their review, there were five different exercise regiments that they examined in relation to fatigue: (a) pulmonary rehabilitation, (b) aerobic exercise, (c) resistance training, (d) balance programs, and (e) medical qigong. Henshall et al. (2019) acted as a gap in the literature for this current study, simply because the authors demonstrated a lack of studies that have been completed in relation to PA and the management of fatigue.

Lung Cancer and the Challenges of the COVID-19 Pandemic

There have also been some challenges related to lung cancer patients amidst the COVID-19 pandemic. Shankar et al. (2020) reported that there are many challenges for

lung cancer patients in a COVID-19 landscape, especially when it comes to receiving treatment and attending medical appointments. The authors reported that lung cancer patients are more apt to be affected by COVID-19 due to their decreased ability to fight illness. However, despite the attendance of medical appointments and treatment, there are other challenges that have emerged during the pandemic. For example, Avancini et al. (2020) reported that oncological patients experience challenges when it comes to PA during the COVID-19 pandemic. The authors reported that PA is decreasing among cancer patients because of their inability to leave the house. Therefore, they reported that home-based PA could be beneficial during times of quarantine and physical distancing. For oncology patients, Avancini et al. reported that the American College of Sports Medicine recommends a moderate intensity aerobic training program that is completed at least three times per week for a period of eight to 12 weeks. The authors encourage cancer patients to complete these activities at home, which can allow for a decreased exposure to virus while still maintaining a healthy lifestyle. However, it is important to note that cancer patients may need additional support and resources due to their inability to be motivated to complete PA, as well as take into consideration any potential medical side-effects (Moraliyage et al., 2021).

Lung Cancer and PA

Traditionally, patients diagnosed with cancer, regardless of the specific type, were given the advice to rest, recover, and just conserve their strength and energy so they can focus on getting chemotherapy and not tax themselves too much. In essence. they are being told to avoid engaging in any PA that can lead to tiredness or exhaustion

(Baumeister et al., 2020; Kong, Shin et al., 2020; Johnsson et al., 2019). Nevertheless, this advice started to draw opposition in the 80s. New data progressively emerged to show that PA is necessary to prescribe, as well as other treatments and procedures for cancer patients. PA is described as any bodily movement produced by skeletal muscles that leads to the expending of energy (Baumeister et al., 2020; Kong, Shin et al., 2020; Johnsson et al., 2019).

Exercise is a form of PA, referring to the planned, structured, repetitive activities to improve or maintain one's physical fitness or some of its components. PA in general, may provide relevant benefits in oncology. Studies have increasingly shown an inverse relationship between PA and mortality rates or the recurrence of cancer among cancer survivors. PA was also found to be beneficial during the treatments themselves, not just after. Such studies have shown that engaging in PA while receiving treatments leads to meaningful improvements in overall fitness, quality of life, treatment-related side effects, and psychological effects of anxiety, depression, and self-esteem. Increased vitality was also commonly observed among cancer patients getting treatments and engaging in PA. Traditionally, cancer patients getting treatments can look understandably more tired than other people. Despite these studies and the released American College of Sport Medicine guidelines for PA in cancer patients, one noticeable common factor among them is that they are directed or focused on patients with breast, prostate, colon, gynecologic, and hematological cancers. No such universal recommendations are made for people with lung cancer.

Studies have revealed various biological mechanisms that can explain the link

between cancer and PA. Because PA can control for chronic low-grade inflammation and the modulation of metabolic dysregulation substances such as insulin and glucose, and sex hormones, PA can affect oxidative stress and immune-related function, changing specific mechanisms known to be linked to the tumor microenvironment, leading to proliferation, angiogenesis, or apoptosis, among others.

Dhillon et al. (2017) studied whether providing a PA intervention with a span of two months can lead to less fatigue and better quality of life for people already at the advanced stages of lung cancer. The researchers gathered data from participants with advanced lung cancer given a prognosis of fewer than six months to live and yet can still complete a six-minute walk test. The patients were placed into two groups, one in a nutrition and PA education materials group and another in a higher-level experimental intervention composed of two-month supervised weekly PA and regular behavior change sessions. The assessments took place at baseline, at second month, at fourth month, and the sixth month. The first goal was to witness fatigue decrease at two months. Findings revealed that among 112 participants studied, there were no significant differences between the two groups in terms of their fatigue levels at the second, fourth, and sixth months. There were also no significant differences between the two groups regarding their quality of life, physical fitness, symptoms, and even survival. These unexpected findings concluded that PA at a limited level and a higher level does not make a massive difference in fatigue or quality of life. Because the researchers did not study a group that did not receive any intervention, it can be concluded that PA, no matter how large or small, is crucial for managing fatigue and maintaining a positive quality of life. Given the

entirely unexpected findings, the researchers called for more studies to be done, which the present research will do.

Peddle-McIntyre et al. (2019) discussed that patients diagnosed with advanced lung cancer usually have a wide range of severe symptoms to handle, which is a heavy burden. Co-existing conditions can be aggravated, leading to poorer quality of life. At the same time, indirect or side effects of powerful cancer treatment can commutatively make patients feel hopeless and demotivated to move. This can lead to the deconditioning of the body and low PA capacity of the patient. Because PA capacity is treated as an indication of whole-body health that must be measured, having a low capacity and motivation to move is worrying. Clinical experts also claimed that PA capacity is crucial to a patient's overall capacity to participate in life activities and withstand the challenging treatments combatting the cancer cells. Experts have provided evidence that PA can improve muscle strength and force, thereby the functioning of the patient, which in turn is linked to higher levels of health-related quality of life among those trying to fight their cancer or those who have survived. The researchers designed a systematic literature review to investigate how PA can improve capacity in adults already diagnosed with advanced stages of lung cancer. In this study, the researchers deemed PA capacity as the capacity to cover a six-minute walk distance, as measured through a six-minute walk test. The researchers also assessed how far each patient with advanced levels of lung cancer could cover within six minutes. They also check the peak oxygen uptake of each of the patients as they were completing a maximal incremental cardiopulmonary exercise test. Apart from PA capacity improvement, the researchers also evaluated whether PA could

enhance the capacity of peripheral muscles to generate greater force, the quality of life of the participants, and the physical functioning of each. They also checked each patient's feelings of anxiety and depression.

A total of six studies were reviewed, as they were the only ones that satisfied the criteria set. Results showed that participants experienced higher PA capacity upon completing the intervention program than those in the control group. Basically, all the participants in the experimental group were able to complete the six-minute walk test. In addition, quality of life was also experienced by the participants compared to those in the control group. However, one unexpected finding is that there was no significant difference between the two groups, those who underwent the intervention program and those that did not, concerning physical functioning, dyspnea, anxiety, and depression. The researchers concluded that there are definite benefits that can be gathered from PA by people diagnosed with advanced lung cancer. PA interventions can enhance the PA capacity in this dangerous stage of his or her disease and avoid a decline in disease-specific quality of life. Even though it is remarkable and surprising to note that no significant effects were observed from the PA on dyspnea, fatigue, anxiety, and depression, as hypothesized, the researchers cautioned about taking their findings at face value. There are limitations to implementing the research properly, so the findings might not be as accurate. For one, the RCTs involved are too few. The researchers called for more extensive, higher-quality RCTs to be reviewed. The impact of PA on lung cancer patients in advanced stages can be more valid and reliable.

Cavalheri et al. (2017) also studied the impact of a supervised PA programs

among lung cancer patients. They evaluated this program's effects on the patients' PA capacity, PA level, and sedentary behavior. Like Peddle-McIntyre et al. (2019), they studied the patients' peripheral muscle force and health-related quality of life and whether they have been improved by the PA they were subjected to. The researchers evaluated the effects of PA on patients with lung cancer's feelings of anxiety and depression and lung function. While Peddle-McIntyre et al.'s study was a systemic review, Cavalhari et al. conducted research conducting a pilot, randomized controlled trial involving participants who just underwent lobectomy within the last six to 10 weeks before the study. They also ensured that they participated in the program four to eight weeks after their last cycle to avoid detrimental consequences among those who needed adjuvant chemotherapy. The participants were categorized into two groups, one randomized and one control group. The randomized group had to undergo eight whole weeks of PA under supervision.

In contrast, those in the control group had to go through the usual care they received for the same period. All participants, regardless of their groups, had to be measured for PA capacity, PA and sedentary behavior, quadriceps and handgrip force, fatigue, feelings of anxiety and depression, and lung function at the baseline level to measure the changes caused by PA significantly. Seventeen participants were included, nine placed in the PA group and the remaining eight on the control group. Results showed that those in the treatment group, compared to those in the control group, experienced more significant improvements in their peak rate of oxygen consumption while performing activities. More of them were also able to cover the 6-minute walk distance as well. The findings concluded that lung cancer patients might specifically

benefit from participating in an PA training program.

According to Granger et al. (2018), the myriad of studies that have established the importance of PA on patients diagnosed with lung cancer has no value if the patients themselves are not striving to be physically active. The reality is that most patients with such disease are not meeting the minimum weekly recommended PA levels. This means that regardless of the studied benefits, the patients themselves require a massive boost to start moving. The researchers conducted their study to determine the feasibility of a PA self-management program designed to heighten the PA levels that the patients can habitually engage in while undergoing treatment for lung cancer. They also studied the effectiveness of such a program. The researchers focused on prospective case series involving patients who can undergo medical operations for their lung cancer. Participants were given the option to start the program before or after their surgery. Only six participants out of the 31 opted to start the program earlier. Results were quite promising. The PA program led to the maintenance of the participants' PA eight weeks or two months after receiving surgery. The expected findings are that the participant's PA levels will decline after their surgery, but the program ensured their energy levels were maintained at sustainable levels.

Granger et al. (2018) explored patient experience and preferences for PA after they were diagnosed with lung cancer. Unlike the other past studies, which were primarily quantitative, the researchers conducted a qualitative study involving seven patients receiving treatment for their disease for the past two years. The primary research tool was a focus group interview. Data gathered from the group discussion was analyzed

using a conventional content analysis strategy that revealed themes that ascertain the need to implement PA services into routine clinical care for lung cancer patients. At the same time, the participants have made suggestions on how they can be pushed to be motivated to engage in PA and the factors that further improve their overall healthcare experience. They claimed the need to have better access to fitness professionals after getting their cancer treatments. They also claimed a need to improve their information and knowledge about PA in different formats. Factors that can improve the impact of PA on their prognosis and health include supervision from health experts and consistent peer support. The lack of support can be demotivating. The participants also highlighted the value of using behavioral change strategies to lead to specific sustainable increases in the patients' PA.

Bade et al. (2016) studied how advanced-stage lung cancer patients can specifically benefit from increasing PA and stay safe if they do so. Advanced-stage lung cancer patients have the worst symptoms and the quality of life, especially when it is told that the survival rate is exceptionally low at this stage. The researchers evaluated the feasibility of monitoring step count in advanced lung cancer and the link between correlations between PA and quality of life. Bade et al. employed a prospective, observational study involving 39 consecutive patients with advanced-stage lung cancer. For one week, the researchers observed their daily step count through a Fitbit Zip and computed their quality of life, dyspnea, and depression scores using pre-existing instruments. Spearman rank testing analysis revealed that those with higher average daily step count were also those with a higher quality of life. The higher average daily count

was also linked to better physical and emotional functioning. At the same time, they also have lower depression, dyspnea, and pain than those with a low step count. The researchers concluded that simply increasing one's range of movement, such as walking more, can have undeniable benefits to people who have advanced-stage lung cancer. Many more subsequent studies support this.

Singh et al. (2020) conducted a systematic literature review and metanalysis to evaluate the safety, feasibility, and effectiveness of PA for patients with lung cancer. While benefits of PA have always been lauded, there is a usual conception that moving around while dealing with an already significant disease is not going to do the patient well, with the risk of exhaustion and overtaxing of one's already frail body. The researchers ended up with 32 trials involving different sorts of PA trials to review. Results showed no difference in the risk of an adverse event between those who participated in an PA program and those given the usual care. However, there were undeniable benefits to incorporating PA in the care of patients with lung cancer. The researchers found significant positive benefits of PA in terms of the patients 'quality of life, aerobic fitness, and upper and lower body strength. Results also showed improvements in the patients' quality of sleep and reduced their forced expiratory volume. The factors of safety, feasibility, and effect were the same across stages of the disease and PA characteristics, which disprove conceptions that specific PAs are better off not being done by people of a particular lung cancer diagnosis because they may be risky or not safe. Results showed that patients with lung cancer, no matter the stage, can enjoy the benefits from PA. The risk of an adverse event due to PA is low across stages.

Results also concluded that PA can be feasibly undertaken after being diagnosed and that there are undeniable benefits in performing PA on physical health, appearance of the patient, and their psychological and emotional states.

Michaels (2016) also focused on the importance of PA for individuals who have been diagnosed with lung cancer and are receiving treatment. The author reported that PA is very important for individuals who are undergoing lung cancer treatment, simply because it focuses on increasing strength, endurance, and decreasing emotional issues (Michaels, 2016). Additionally, because lung cancer patients are increasingly surviving their diagnosis, the importance of PA regimens are paramount because they provide both physical and emotional coping mechanisms required for improving their overall health-related quality of life.

Finally, Avancini et al. (2020) highlighted varied factors of PA in cancer patients during their different treatments. The results of the authors' study highlighted that although patients can struggle at times to complete PA regimens, they are more influenced to participate in such regiments due to differing factors. These factors included medical advice, social support, enjoyment from PA, the ability to set personal goals, and whether they own an animal. The authors purported that it is important to ensure that exercise regimens are individualized to meet each patient's needs; this way, they can also experience an increase of motivation to complete PAs.

PA

A quick review of the presently available literature would show that the discussion on PA concerning lung cancer is still quite limited compared to other types of

cancers or other types of behavioral interventions. What is even more lacking is the discussion of how PA is influenced by anxiety, depression, and fatigue. In this section, some studies revealed that PA programs could not be implemented at any time during the treatment regimen and will be discussed (Bade et al., 2018; Cavalheri & Granger, 2020; Kong, Shin et al., 2020). None of these studies evaluated how PA is influenced by anxiety, depression, and fatigue. Instead, they discussed that PA could lead to the desired outcomes on certain occasions, and on others, PA can lead to adverse outcomes. This means that there is an issue in the understanding of how PA is influenced by anxiety, depression, and fatigue that must genuinely be considered (Bade et al., 2018; Cavalheri & Granger, 2020; Kong, Shin et al., 2020).

Kong, Park et al. (2020) was among the few researchers who evaluated whether a particular time or season can affect the effectiveness of PA in improving the quality of life and patients' physical and emotional functioning with lung cancer. The researchers deduced that both season and temperature levels could affect PA and while using a wearable device due to surgery for their cancer. Gathering data from the PA record found on 555 preoperative lung cancer patients', wearable devices and analyzed by season (spring, summer, autumn, and winter), the researchers found that the season is a predictive variable in the number of steps a patient would take in a day. Patients in the winter season are less likely to engage in walking and other PAs than patients in spring. Daily steps were found to be negatively linked with wind chill temperature among patients who lived in Seoul. The researchers concluded that their findings showed how the seasons predicted how a PA program can be offered. This is crucial to note when

creating interventions to improve PA levels.

Cavalheri and Granger (2020) conducted a literature review to describe the benefits of PA comprehensively on lung cancer patients through the disease and treatment pathway. The researchers aimed to provide a clearer understanding of how feasible, safe, and essential PA training can be for lung cancer patients. The researchers also added a topical discussion of how PA can be safe and beneficial for those already with bone metastases and how it can suppress tumor growth. Findings revealed that PA training should be crafted differently among lung cancer patients in the early stages of their lung cancer and the advanced stages of their disease. The benefits of even a small PA program may be more beneficial for those in the advanced stages. However, the safety issue is also higher, so accommodations and adjustments need to be made. In addition, for those with bone metastases, the PA regimen should also be uniquely tailored to their needs and capacities; otherwise, PA can lead to adverse outcomes. Regular PA that is not carefully created to meet the needs of people with bone metastases can lead to high compressive and shear loads on the affected skeletal sites. However, this does not mean PA would not benefit them if done right. The researchers claimed that in patients with lung cancer, metastasis is not a blanket reason to stop PA altogether. Instead, such patients only need to be treated by health professionals specializing in exercise oncology. Their PA regimen should be crafted by an oncology physiotherapist and exercise physiologist.

Bade et al. (2018) focused on why a patient-centered PA program is the most effective in improving the quality of life in patients with advanced-stage lung cancer. The

researchers tested their hypothesis that a PA regimen can be more effective in improving the daily life functioning of patients if it is based on the patients' preferences and motivation compared to the caregivers through experimental research. The researchers designed a walking-based activity regimen and grouped the participants into two groups. The first group of participants is motivated to move through the regular phone calls, wherein a Fitbit zip accelerometer measures their actual activity. The second group underwent a patient-centered PA regimen. They also had their activity monitored through a Fitbit. However, they were given one educational session only and twice a day gained-framed text messages, instead of phone calls, so that the patients can have the freedom to engage in their program. Data for four weeks were gathered and analyzed. Results confirmed the researchers' hypothesis that subjects in the second group, where participants are left more to their own devices, were more frequent movers than the data in their device. Patients under the patient-centered program also had fewer missing data, which meant they were more motivated to wear their devices and move. The findings concluded that the freedom to engage in PA might depend on the patients themselves and not on some clinical expert's judgment.

In comparison to participants getting weekly phone calls, those in the patient-centered program were likely to experience higher PA levels and higher levels of patient satisfaction. The researchers did not study whether a patient-centered PA program can improve the symptom burden, quality of life, and mood of lung cancer patients. These can only be deduced from the increase in the participants' PA, but more studies should be conducted.

Chang et al. (2020) designed a study to explore the PA experiences of patients with metastatic lung cancer. Patients diagnosed with metastatic lung cancer can experience severe and painful symptoms, whether linked to their cancer themselves or the treatments they are being given. Both groups of severe symptoms can lower patients' quality of life. The researchers interviewed 24 patients with metastatic lung cancer at an inpatient ward of a medical center, and interview data were interpreted using narrative analysis. Results of the study showed three key themes. First, if the type of PA is modified, physical functions are likelier to be more maximized. They found that lung cancer patients are more likely to adjust their PAs if they are genuinely willing to engage in PA so that they may be able to balance disease and treatment-induced deteriorations with their desire to move. The second theme is that most lung cancer patients are hopeful about the benefits of PA on their conditions that they are willing to move regardless of their symptoms and occasional frustration. The third theme is that doing PAs can sustain the hope felt by each participant, improve their inner strength, and power, and enhance their quality of life. Several secondary findings were also found. First, among the PA that patients can choose from, walking is their choice because of its convenience. Second, they still accommodate PA by completing it in shorter time duration and covering shorter distances among patients with severe symptoms. They lower their speeds but engage in higher frequencies to balance it out. The researchers concluded that cancer patients understand the value of PA and adjust the activities they do to balance them with their conditions. The downside of the study was that the researchers focused on already active patients and did not consider physically inactive lung cancer patients, who would

probably not adjust their PA to balance a need to move and a desire to stay comfortable, like those already active.

Finley et al. (2020) explored the feasibility, acceptability, and perceived quality of a surgeon-crafted PA regime for patients with lung cancer before surgery. The researchers conducted a single-arm, pre-post feasibility study that was created involving 30 patients of varying stages already scheduled for their respective surgeries. Each of the participants' PA data was measured using a Garmin Vivoactive HR device. They were all prescribed 150 minutes of PA weekly, from moderate to vigorous levels. The participants completed assessments on four separate occasions and were interviewed twice. Results from the interview revealed that the PA regime is feasible and acceptable and particularly helpful in making patients prepared and fit for their respective surgeries.

Quist et al. (2020) studied how patients with advanced inoperable lung cancer can experience improvements in their physical and mental conditions through PA. The researchers randomized 218 patients with advanced inoperable lung cancer to either a control group or an experimental group. The latter group participated in a 12-week supervised, structured PA training program composed of various training, from aerobic, strength, and relaxation training, twice a week. The control group participants were given the usual care. The specific outcome measured was the participants' maximal oxygen update. Secondary updates include the participant's muscle strength, functional capacity, as well as forced expiratory volume. The researchers evaluated whether the participants' quality of life, anxiety, and depression were affected by the PA. Results showed that between those who underwent the PA training program and those that did not, no

differences were found in their VO2 peak. Results revealed that among those who underwent the PA training program for three months, muscle strength improved. Results showed a significant difference between the two groups in terms of their social well-being. This led to the conclusion that a PA regimen can significantly reduce anxiety and depression levels while improving the strength and function of the patients' muscles. Unlike other studies, the researchers also found that PA is linked to better social well-being, which can lead to a better quality of life. Although the primary outcome did not show significant improvement in the participants' VO2 peak, present findings may be enough to show that future patients with advanced inoperable lung cancer should be considered for supervised PA when treating their disease or managing their conditions.

Rana et al. (2020) conducted a systematic review of the literature on the link between occupational PA and lung cancer risk. The researchers mainly included observational studies in their review. Out of the 2065 articles that initially satisfied the criteria, only 13 journal articles were finally included and reviewed because they were the ones that completely matched what the researchers were looking for. The review showed that men who have reported a higher level of occupational PA were also at higher risk of getting lung cancer. On the other hand, PA can improve the well-being of those who have already been diagnosed with the disease, which shows the paradox of this condition concerning PA (Rana et al., 2020).

Another paradox was noticed by Ciuró et al. (2020). The researchers asserted that PA among lung cancer patients could cause functional impairment and even disability, even if there are benefits from moving more frequently. In their study, the researchers

evaluated the relationship between disability and PA among lung cancer survivors in an observational study. Participants were classified into an experimental and control group, wherein the former was evaluated using a Fitbit Activity Monitor concerning their level of PA throughout the day. The researchers were administered the World Organization Assessment Schedule 2.0 to assess their disability level. Forty patients and 20 controls were covered in this study, wherein 23 patients were active, and the rest are less active a year after being diagnosed with their disease. Results showed that PA certainly matters for patients with lung cancer. The active group obtained significantly better results in mobility, self-care, and functionality than the less active group. However, their disability level based on the WHODAS is also higher than those in the control group. This means that the more active group is more prone to incurring disabilities, even though they experience improved functionality compared to those who are not active.

Another study that revealed the importance of PA is Harrison et al. (2020). The researchers quantified PA for one week after patients with lung cancer underwent their treatment surgeries, either an open or robotic thoracic surgery. Participants were asked to wear a hip mounted Actigraph GT3x+ accelerometer during their waking hours after their respective surgery for at least three days. Results showed that PA levels are usually low after the surgery. This is significantly linked to time spent in hospital and pre-surgery exercise capacity. The researchers called for creating pre-habilitation and post-surgery PA interventions that would consider the lung cancer patients' operational schedules and integrate programs that can be carried out in a home setting.

Ha et al. (2020) showed one more reason why PA can be crucial for patients

diagnosed with lung cancer. The researchers claimed that PA assessments could help predict outcomes for patients already diagnosed with the disease, mainly showing their chances of recovery and functionality after getting their respective treatments. The researchers examined the link between pre-diagnosis PA behavior and clinical outcomes among lung cancer patients between the first to third stages to evaluate their hypothesis. In a retrospective cohort study encompassing patients of a Colorado lung center, the researchers evaluated the effects of PA on outcomes, wherein demographic, sociodemographic, clinical, and lung cancer characters were all adjusted. Among the 552 lung cancer patients, only 42% claimed they were physically active before being diagnosed with cancer. Results showed no significant differences between the active and inactive lung cancer patients as to their stage distribution. Some active patients were diagnosed with stage three cancer the same as those who were inactive. The same can be said among those diagnosed with stage one and stage two lung cancer. As to their survival times, the active group also has higher median survival times than inactive patients by 0.6 years (Ha et al., 2020). The study was more interested in whether physical activeness before diagnosing lung cancer can have some benefits after a person is unfortunately diagnosed. Results confirmed that pre-diagnostic PA was linked with better outcomes following diagnosis. A finding that is not supported by other studies claiming activeness levels has no impact on cancer risk. At the same time because Ha et al. claimed that there are no significant differences between those who were active and those who were not in terms of their risks of cancer stages upon diagnosis, it can also be said that there is an alignment with past studies, claiming PA does not have an impact on

cancer risk (Ha et al., 2020).

To reiterate, none of these studies evaluated how PA is influenced by anxiety, depression, and fatigue. Instead, they discussed that PA could lead to the desired outcomes on certain occasions, and on others, PA can lead to adverse outcomes. This indicates there is a lack in understanding how PA is influenced by anxiety, depression, and fatigue for lung cancer patients that must indeed be considered, highlighting the discussion of the literature gap that the present study is designed to close.

Literature Gap

There is a gap in the literature on PA and how it is influenced by anxiety, depression, and fatigue. PA can benefit the mental health of patients diagnosed with lung cancer. The literature review so far established that individuals experience psychological distress which includes anxiety, depression, and fatigue after receiving a lung cancer diagnosis, reducing their levels of psychological health (Eichler et al., 2018). Research has demonstrated that the relationship between PA and lung cancer is also significant concerning struggles with psychological distress (e.g., anxiety, depression, fatigue) (Agarwal et al., 2017; Eichler et al., 2018; Lehto, 2017; Mainini et al., 2016). Furthermore, individuals diagnosed with lung cancer experience coughing and shortness of breath, increasing psychological distress (Lehto, 2017). Nevertheless, very few studies looked at exactly how the PA regimen should be crafted or whether PA is influenced by anxiety, depression, and fatigue. Despite evidence that people with cancer can safely perform moderate-intensity PA, many patients do not adhere to or meet the recommended guidelines (Granger et al., 2018). In lung cancer research, the least understood PA aspect

in the treatment of cancer, is understanding how PA is influenced by anxiety, depression, and fatigue. Understanding how PA is influenced by anxiety, depression, and fatigue may increase psychological health outcomes (Yin et al., 2016). Therefore, given the low survival rates among lung cancer patients, understanding the preventive effects of PA in lung cancer and its impact on psychological health, anxiety, depression, and fatigue has important public health implications for future screening and treatment of lung cancer (Vainshelboim et al., 2019).

The relationship between physical inactivity and lung cancer is significant; physical inactivity is an additional behavioral risk factor in developing lung cancer modifiable through behavioral change strategies (Cannioto et al., 2018; Pozuelo-Carrascosa et al., 2019). PA is recognized as essential and crucial in cancer research's health-promoting behavior to improve overall psychological health (Bade et al., 2018; Timmerman et al., 2018).

Summary

The purpose of this qualitative interpretive phenomenological analysis (IPA) study was to explore the lived experience of patients diagnosed with lung cancer on how PA was influenced by anxiety, depression, and fatigue. In lung cancer treatment, indicating how PA is influenced by psychological distress can lead to increased long-term health benefits (e.g., perceived health status, physical functioning, psychological functioning) associated with PA performance (Payne et al., 2018; Rutkowska et al., 2019). Understanding how PA is influenced by psychological distress could help to understand the link to improved psychological health and decreased anxiety, depression,

and fatigue levels.

To carry out the research, the data for this study was collected using semi structured interviews where the participants were asked the same open-ended questions in which they could answer in any manner that they saw fit. The semi structured interviews were conducted via Zoom video conferencing to align with the Center for Disease Control and Prevention's (CDC) social distancing guidelines in response to the COVID-19 pandemic. The procedures will be discussed in detail in the next chapter.

Chapter 3: Research Method

The purpose of this qualitative interpretive phenomenological analysis (IPA) study was to explore the lived experience of patients diagnosed with lung cancer on how PA was influenced by anxiety, depression, and fatigue. A better understanding of these experiences could be used to improve treatment for increased long-term health benefits (e.g., perceived health status, physical health, psychological health) associated with PA performance (Payne et al., 2018; Philip et al., 2014; Rutkowska et al., 2019). This chapter provides the research design and rationale for this study. Additionally, this chapter addresses the methodology, including the population of interest, sampling process, recruitment procedures, and data collection processes. The method used to recruit lung cancer patients will be also discussed. Lastly, ethical considerations for data collection procedures, data analysis, and reliability and trustworthiness are discussed.

Research Design and Rationale

This study followed a qualitative method with an interpretive phenomenological analysis (IPA) design. This approach aligned with this study's research questions:

- Overall RQ: What is the lived experience of lung cancer patients with the impact of psychological health on PA?
- RQ 1: How is PA influenced by anxiety?
- RQ 2: How is PA influenced by depression?
- RQ 3: How is PA influenced by fatigue?

A qualitative IPA study was considered a common approach to this form of research study, as the phenomenon was complex and emotionally charged (see Creswell, 2014;

Peat et al., 2018; Smith & Osborn, 2015; Tuffour, 2017). This type of method had specific advantages that included allowing the participants to answer open-ended questions in any manner that they saw fit to better understand their world view of a phenomenon and their complex lived experiences.

Methodology

Population

This study's target population included both males and females, 40 plus years of age, and had been diagnosed with lung cancer. Performance status was either 0 or 1, according to the Eastern Cooperate Oncology Group (ECOG-ACRIN Cancer Research Group, 2020). Participants lived within the United States, spoke English, and understood and signed consent for participation in the study.

Sampling and Sampling Procedures

I followed a purposive sampling strategy to attain participants this study. This meant that individuals were selected from the population based on the researcher's judgment and specific criteria (Peat et al., 2018; Smith & Osborn, 2015; Sharma, 2017). Lung cancer patients were a specific population and were recruited through the online platform of ResearchandMe.com and through word of mouth. For this study, I recruited seven participants which allowed for saturation in the data collection process (see Peat et al., 2018).

Procedures for Recruitment, Participation, and Data Collection

The participants were recruited via ResearchandMe.com and through word of mouth. ResearchandMe.com aimed to connect participants to researchers around the

United States. I created recruitment flyers posted on ResearchandMe.com and posted within the local community to attract the population I was interested in researching. The recruitment flyers highlighted the purpose of the study, what was expected or required of the participants, the criteria needed to participate, and my contact information. Before posting the recruitment flyers I received permission from my university's Institutional Review Board (IRB; approval no. 01-21-22-0730690) as well as approval from ResearchandMe.com administrators and permission to post the flyers in local businesses. An eligibility questionnaire provided more personal information on the participant to create a better understanding of their environment (Appendix A).

Interested participants contacted me if they were interested in participating in the study. Before participating in the study, I checked to ensure that they met all criteria and then provided them with an informed consent. The informed consent highlighted the purpose of the study, what was required of the participants, how confidentiality would be maintained and protected, contact information to the university's IRB and research chair, and the level of risk associated with participating in this study, which included feeling uncomfortable providing information about their physical and emotional state of mind. Respondents had the opportunity to remove themselves from the study at any time without any repercussions. The participants were asked to answer truthfully and to the best to their knowledge 11 semi structured interview questions based on their experience with lung cancer and how PA performance was influenced by anxiety, depression, and fatigue (Appendix B). The interview took approximately 30 to 40 minutes for each participant. The participants could also refuse to answer any open-ended question in the

semi structured interview without any repercussions.

Data Collection Methods

In this study, the data collection method included semi structured interviews. I developed a list of 11 open-ended questions that are in alignment with my study's problem, purpose, research questions, conceptual frameworks, and research methodology. After developing the list of questions, I then employed a panel of experts who reviewed the interview questions to ensure that they were in alignment. If any members of the panel reported any inconsistencies or areas of misalignment within the research questions, they recommended changes. After receiving any recommendations for changes, I then discussed this issue with my university's chair and made the changes as recommended. When conducting the semi structured interviews, I asked each question in the same manner to each of the participants and allowed them to answer the questions in any manner that they saw fit. A list of the semi structured interview questions can be found in Appendix B.

Data Analysis Plan

I used manual hand coding to complete the data analysis for this study. When completing the analysis, I was guided by the following research questions:

- Overall RQ: What is the lived experience of lung cancer patients with the impact of psychological health on PA?
- RQ 1: How is PA influenced by anxiety?
- RQ 2: How is PA influenced by depression?
- RQ 3: How is PA influenced by fatigue?

Data Assumptions

There were some data assumptions in qualitative research that needed to be addressed in this current study. The main assumption was that the data collected thoroughly represented exactly what the participants said. To address this assumption, I completed member checking, which involved the participants reviewing their interview transcripts to ensure that they were accurate. If any of the participants reported inaccuracies within the transcripts, I would have discussed this with my university chair and made changes to reflect exactly what the participant said. The process of member checking also aided in decreasing any instances of researcher bias.

Reliability and Trustworthiness

Reliability was concerned with the study's generalizable result beyond the study's intention and applied to the real world (Rose & Johnson, 2020; Warner, 2013). The results of this study may not have been generalizable to other populations and geographical regions where the study was taking place. To ensure that the study's results were dependable, I addressed researcher bias, using a panel of experts who reviewed the semi structured interview questions. When reviewing the questions, the members of the panel ensured alignment between the problem being studied, the purpose, the research questions, and the conceptual frameworks. If any members identified any areas of misalignment, I made changes accordingly after discussing with my university's chair.

Additionally, I addressed reliability of the study by completing member checking. I had the participants review the transcripts of their semi structured interviews to ensure that what they said was entirely represented in the data. If any of the participants reported

any inaccuracies in the dataset, I would have made the changes to reflect exactly what they said.

Ethical Procedures

The sample population was recruited online and through word of mouth after submitting the IRB application and approval to proceed with data collection. The IRB application covered procedures and information about the participants and ethical issues in a research study and the data collection process. IRB committees exist according to federal regulations to protect human rights (American Psychological Association, 2020; Creswell, 2014). Additionally, before I posted any recruitment flyers to ResearchandMe.com, I ensured that I received approval from the platform's administrators. This study aimed to explore the lived experience of lung cancer patients on how PA was influenced by anxiety, depression, and fatigue. The participants may have felt uncomfortable providing information about their physical and psychological health (see American Psychological Association, 2021). The informed consent form stated that participants could have opted out from the study at any point in time they thought was necessary and without any repercussions.

Ethical Issues in Data Collection

Researchers are obligated to maintain the privacy and confidentiality of all collected data for their study as established by law and institutional rules (American Psychological Association, 2021). When information is collected electronically, there is the potential for a security breach. Security breaches occur when a patient's confidential data are provided to others without their consent (Ozair et al., 2015; Rose & Johnson,

2020). The main factor in maintaining participants' privacy and confidentiality in a study is to ensure that only authorized persons can access the data collected for analysis. Therefore, when completing the data collection and study's procedures, I maintained participant confidentiality by referring to the participants in a numerical order (e.g., Participant 1, Participant 2, etc.). Additionally, I recruited individuals on a first-come-first-served basis and did not document any identifying information of the participants when writing-up the study's findings. Any other information obtained from the participants during this study was also deidentified. For example, if participants stated a hospital or doctor's name in their semi structured interviews, I listed these in alphabetical order (e.g., Hospital A, Doctor A, Hospital B, Doctor B, etc.).

Ethical Concerns in Data Protection and Storage

The data collected for this study were confidential. Data storage was crucial for maintaining the data's confidentiality for the designated time of 5 to 10 years (Creswell, 2014; Mohd Arifin, 2018). Recorded interviews will be destroyed after 5 years. I will maintain passwords for computer entry and keep up with antivirus software tools, make sure operating systems have firewalls, and make sure software are up to date (see O'Toole et al., 2018). Another crucial part of securing data is to prevent the loss of that data. The researcher should backup all information regularly in at least two separate locations (O'Toole et al., 2018). This study will be published as a Walden University dissertation and available to future researchers for investigation.

Summary

Chapter 3 described the research design, rationale, and methodological approach.

The population, sampling, and recruitment procedures were additionally defined for this study. The analysis plan was introduced including a discussion on reliability and trustworthiness and ethical procedures, issues, and concerns. Chapter 4 will provide a detailed analysis of the results from the collected data.

Chapter 4: Results

Individuals experienced anxiety, depression, and fatigue after receiving a lung cancer diagnosis, which reduces their levels of psychological health and health-related quality of life (Eichler et al., 2018). But research has demonstrated that PA can help in dealing with psychological distress (Agarwal et al., 2017; Eichler et al., 2018; Lehto, 2017); however, it was currently unknown when patients experienced the implementation of PA as being beneficial to their mental health (Mainini et al., 2016). Therefore, the purpose of this qualitative interpretive phenomenological analysis (IPA) study was to explore the lived experiences of patients diagnosed with lung cancer on when to implement PA and how it could influence anxiety, depression, and fatigue.

This chapter will report this study's results. I will begin this chapter by providing an overview of the setting and the demographics that the participants presented with when participating in this study. I then provide an overview of how data were collected and how the analysis was conducted. I conclude this chapter with a discussion of how trustworthiness was maintained, the results of the study, and any discrepant cases.

Setting

The setting for this study was on Zoom video conferencing, as during this study the CDC recommended social distancing measures in response to the COVID-19 pandemic. Therefore, I met with four participants via Zoom and did three recorded interviews one on one as requested by the participants. I also encouraged them to follow specific COVID-19 procedures. During each semi structured interview, I encouraged each participant to ensure confidentiality. I asked them to wear headphones and to make

sure that they were in a private location, where other individuals could not overhear our conversation. When interviewing each participant in my private Zoom meeting room and the specific locations of the interviews, I ensured that they were the only ones in the room and ensured that they were the only individuals that were sent the password and link to enter the meeting room.

Demographics

Individuals who participated in the study met the following criteria that included being male or female, being 40 plus years of age, having been diagnosed with lung cancer, residing anywhere in the United States and spoke English, and performance status was either 0 or 1, according to the Eastern Cooperate Oncology Group (ECOG). There were seven individuals that participated in this study. The final number of participants was determined by participants willing to volunteer for the study and data saturation. Data saturation occurred within the seven interviews conducted with each participant.

Data Collection

In this study, data collection only occurred after I had received approval from my university's IRB. The data for this study was collected using semi structured interviews where the seven participants were asked the same 11 open-ended questions in which answered in any manner that they saw fit. The one time semi structured interviews were conducted and recorded via Zoom video conferencing to align with the CDC's social distancing guidelines in response to the COVID-19 pandemic. Three interviews were conducted one on one, as requested by participants, using a handheld voice recorder where social distancing precautions were followed. During each of the semi structured

interviews, I asked the participants the same open-ended questions in the same manner. At times, I also asked additional follow-up questions that helped provided clarity to the participants' responses. No unusual circumstances occurred during the data collection process outside of the waiting period to recruit a considerable number of participants to conduct data analysis.

Data Analysis

I used manual hand coding to complete the data analysis for this study. When completing the analysis, I was guided by the following overall research question and three research questions:

- Overall RQ: What is the lived experience of lung cancer patients with the impact psychological health on PA?
- RQ 1: How is PA influenced by anxiety?
- RQ 2: How is PA influenced by depression?
- RQ 3: How is PA influenced by fatigue?

This study followed a qualitative thematic analysis, where I coded the data by identifying commonly used words, phrases, and ideas that the participants reported (see Castleberry & Nolen, 2018). I continued to search for codes until the process was exhausted, at which point I began categorizing them into different themes. The themes are the results of the study and will be reported in this chapter. I also used a qualitative codebook where I arranged the themes, together with the participants who contributed to each theme, and their direct quotations that supported the thematic category.

Evidence of Trustworthiness

To ensure that the study's results were trustworthy, I followed specific procedures. Because this study was qualitative in nature, researcher bias could have interfered with the results. To address researcher bias I utilized the assistance of a panel of experts who reviewed the semi structured interview questions. If any members identified any areas of misalignment between the problem being studied, the purpose, the research questions, and the theoretical framework, I would have made changes accordingly after discussing with my university's chair. None of the panel of experts recommended any changes.

I additionally addressed trustworthiness of the study by completing member checking. I had the participants review the transcripts of their semi structured interviews to ensure that what they said was entirely represented in the data. Participant 2 reported that she wanted to add to the dataset, so I made the changes to reflect exactly what she said. No other participant in this study reported any inaccuracies in their interview transcripts.

Results

The results of this study found the following eight themes: (a) being diagnosed with lung cancer created fear and left patients feeling scared, (b) distractions and keeping busy are important, (c) increased anxiety left patients feeling unmotivated to be physically active, (d) increased anxiety left some patients determined to keep being physically active, (e) depression left some patients feeling challenged to participate in PA, (f) depression increased some patient's determination and persistence to keep

physically active, (g) fatigue negatively influenced some patients desire to be physically active, and (h) fatigue can be overcome with persistence to be physically active. Table 1 shows my process of categorizing, assigning codes to the categories, and ultimately developing themes from the rich dataset.

Table 1

Codes, Categories, and Themes

Codes	Categories	Themes
Feelings of mixed emotions, uncertain of future	Fear	Being diagnosed with lung cancer created fear and left patients feeling scared.
Keeping up with appointments, continuing with daily routines	Keeping active	Keeping active is key in decreasing symptoms of anxiety, depression, and fatigue.
Increased anxiety, overwhelming thoughts, feelings of guilt	Unmotivated	Increased anxiety left patients feeling unmotivated to be physically active.
Determination to keep active, keep busy to forget	Determined	Increased anxiety left some patients determined to keep being physically active.
Inability to function, past trauma, feelings of guilt	Facing daily challenges	Depression left some patients feeling challenged to participate in PA.
Keep moving, do what needs to be done, denial of limitations	No limits	Depression increased some patient's determination and persistence to keep physically active.
Decreased energy, always tired, cannot get enough rest	Tiredness	Fatigue negatively influenced some patients desire to be physically active.
Continue normal routine, persistence to restore health	Living life	Fatigue can be overcome with persistence to be physically active.

Overall Research Question

The overall research question aimed to understand the impact of psychological health on daily PAs. The first two interview questions were seeking to understand the

individuals' thoughts and feelings about receiving a lung cancer diagnosis and how it impacted them psychologically and physically. Themes 1 and 2 emerged from the dataset: (a) being diagnosed with lung cancer created fear and left patients feeling scared and (b) keeping active is a key factor in decreasing symptoms of anxiety, depression, and fatigue.

Theme 1: Being Diagnosed with Lung Cancer Created Fear and Left Patients Feeling Scared

Four of the seven participants contributed to this theme (see Appendix C for additional quotes). Participant 1 was able to discuss how the initial diagnosis made him feel scared: "In the beginning, I was so scared, thinking boom I'm just going to die and that's going to be it!" Participant 6 stated, "I was very scared, and I was mostly scared. I thought I was going to pass." These responses demonstrated that the participants' usual PAs were paused initially after their diagnosis, because they were experiencing extreme feelings that were based on fear. Fear can intensify the existing feelings from receiving a lung cancer diagnosis and can increase psychological stress related to anxiety and depression. Increased levels of anxiety and depression directly affect the individual's motivation to engage in PAs. Anxiety and depression can create physical symptoms that leave the individual feeling fatigued and unable to participate in physical activities. Symptoms range from increased heart rate, headache and muscular pain, and decreased appetite, as well as lack of quality sleep.

Theme 2: Keeping Active is Key in Decreasing Symptoms of Anxiety, Depression, and Fatigue

The second theme that emerged under the overall research question was that the participants perceived PA as a distraction keeping them busy which helped them to cope with their diagnosis (see Appendix C for additional quotes). Six out of the seven participants contributed to this theme. Participant 2 stated:

> I didn't have time to think about it much. I was busy with PET scans and MRI's. I just kept going and I kept pushing the symptoms and any negative thoughts down. I get up around 8 a.m., go to yoga three times a week and eat three meals a day. I check social media and email. I read a lot, I quilt, I garden, I like to manipulate and organize photographs on the computer and correspond with friends and relatives. I am least depressed when I am busy. I try to stay busy, so I don't get depressed. When I am busy, I don't think about worries, so I don't have time to be depressed.

Participant 4 was able to discuss how she kept busy by stating:

> When I am at work because I don't have time to think about being anxious. I'm still up every morning at 5:30 and I just plow through the day. I just do what needs to be done, I don't have time to think about being fatigued.

In summary, this theme highlighted how the participants perceived that staying busy with physical activities helped them overcome their fear of the lung cancer diagnosis. It also helped them to remain centered as it acted as a distraction for them and allowed them to concentrate on other things other than their illness. Participating in

regular PA before, during, and after cancer treatments reaps several benefits that allow the individual to better cope with day-to-day symptoms. Benefits of regular PA include increased body and brain functioning, reduces feelings of fatigue, helps to lessen anxiety and depression, and increases appetite, as well as improves the individual's quality of life by keeping them functional.

Research Question 1

Research question one aimed to understand how PA was influenced by episodes of anxiety throughout the day. The next five interview questions sought to understand what anxiety means to the participant and how it impacted their motivation to engage in physical activities. Themes three and four emerged from the dataset: (a) increased anxiety left patients feeling unmotivated to be physically active, (b) increased anxiety left some patients determined to keep being physically active.

Theme 3: Increased Anxiety Left Patients Feeling Unmotivated to be Physically Active

Four of the seven participants contributed to this theme (See appendix E for additional quotes). Participant 1 shared how he had not been exercising like he should by stating, "I was physically active before I came down with it. I haven't been exercising the way I should, just because it makes me feel better like I'm doing my part to fight this." Participant 7 reported that increased anxiety also left her feeling unmotivated to participate in PA, as they reported, "I did not want to do anything. I felt helpless. I wanted to get better, but you think, I don't want to suffer."

In summary, the participants reported that feelings of anxiety left them unmotivated to perform PA. However, this appeared in combination with physical

symptoms that did not promote an uncomplicated way to participate in daily PA and made it difficult to stay active. Anxiety, whether it is acute or a chronic condition, can make it hard for the individual to take care of themselves which directly affects their overall health by increasing the feelings of fear. Lung cancer patients can become fearful of participating in PA fearing the feelings of not being able to breath, a rapid heart rate, or experiencing dizziness.

Theme 4: Increased Anxiety Left Some Patients Determined to Keep Being Physically Active

The fourth theme emerged from the dataset where three of the seven participants contributed (See appendix E for additional quotes). Participant 2 discussed how she continued her PA despite the diagnosis by stating, “I knew I had this thing that needed to come out, but I kept going to yoga class until my surgery. I know from past experiences that exercise is good for anxiety and depression.” In addition, Participant 3 reported that staying physically active could help take her mind off the illness and challenges. Participant 3 reported, “It probably made me do more. Just kind of get moving and get going just trying to keep busy so I wouldn’t think about it.”

In summary, these three participants reported PA is a therapeutic way to manage their episodes of anxiety throughout the day. These three participants came to realize, based on past experiences, that maintaining a level of PA enhanced their ability to cope with the cancer and subsequent treatments. It was clear that PA could increase the release of endorphins and serotonin in the brain which helped to improve individuals’ moods.

Regular PA appears to assist in increasing an individual's self-esteem leaving them feeling more positive about living life with a cancer diagnosis.

Research Question 2

Research question two aimed to understand how PA was influenced by episodes of depression throughout the day. The next five interview questions sought to understand what depression meant to the participants and how depression impacted their motivation to engage in normal physical activities. Themes five and six emerged from the dataset: (a) depression left some patients feeling challenged to participate in PA, (b) depression increased some patient's determination and persistence to keep physically active.

Theme 5: Depression Left Some Patients Feeling Challenged to Participate in PA

Three of the seven participants shared their feelings in relation to theme number five (see Appendix E for additional quotes). Participant 1 reported how depression caused him to be less active:

> It's kind of depressing, but I've accepted that it's okay if I don't exercise every other day, it's okay that I am not going to be able to ride my bike and kayak this summer and do other activities I use to.

Participant 7 stated that depression made it difficult for her to remain active, even when family members tried to encourage her to remain active. Participant 7 stated, "I didn't want to do anything for one. I couldn't. After surgery I couldn't walk, I couldn't exercise. I get mad because my niece would tell me to get up and walk."

In summary, this theme highlighted how depression and PA influenced each other. The participants reported that because of the illness they either did not want to

remain physically active or could not remain physically active. This was even despite their loved ones encouraging them to remain physically active. Depression is a mood disorder and can make it difficult to cope with cancer and the treatments and can appear right after being diagnosed or during or after treatments. It becomes difficult to engage in physical activities when the individual is feeling sad, hopeless, or even worthless. A common behavioral symptom of depression is that the individual loses interest in physical activities they used to enjoy.

Theme 6: Depression Increased Some Patient's Determination and Persistence to Keep Physically Active

Four of the seven participants contributed to the sixth theme (See appendix E for additional quotes). Participant 2 reported how PA helped her to overcome depression which increased her level of determination. Participant 2 stated, "I don't think I got depressed, I kept going to yoga knowing that it is good for me." In addition, Participant 3 stated how she kept going by reporting, "It doesn't, I just keep doing what needs to get done."

This theme summarized how maintaining a schedule of regular PA throughout the day could assist in managing episodes of depression. PA before, during, and after cancer treatments is safe and helps to improve the quality of life for the patient. Regular PA helps to reduce side effects of the treatment and helps to strengthen the immune system while helping the body and brain to function better. PA is a positive coping strategy and can boost self-esteem by increasing energy levels which allows the patient to accomplish more in their daily routines.

Research Question 3

Research question three aimed to understand how PA was influenced by episodes of fatigue throughout the day. The next five interview questions sought to understand what fatigue meant to the participants and how fatigue impacted their motivation to engage in normal physical activities. Themes seven and eight emerged from the dataset: (a) fatigue negatively influenced some patients desire to be physically active, (b) fatigue can be overcome with persistence to be physically active.

Theme 7: Fatigue Negatively Influenced Some Patients Desire to be Physically Active

Six of the seven participants contributed to this theme (See appendix E for additional quotes). Participant 1 stated, "When I start to work on something physical for very long, I get fatigued very fast and I just want to stop. I find myself stopping to rest for five minutes in the middle of activities." In addition, Participant 5 shared his emotions by stating:

> I was an active guy and once I started taking all the medications and stuff, I'm fatigued. Before that no fatigue. Everything was good and then I started taking this chemo pill every day and that takes a lot out of my body. That really affects me a hundred percent, it's terrible.

In summary, these participants described how the symptoms of fatigue could begin to influence PA levels throughout the day. Cancer-related fatigue does not get better with rest and leaves the patient feeling too tired to do normal everyday activities. Patients who are experiencing fatigue, feel overwhelmed at the thought of engaging in

PA but too much rest can lower energy levels leaving the patient feeling even more fatigued. It is important for the patient to find a balance between rest and PA.

Theme 8: Fatigue can be Overcome with Persistence to be Physically Active

Five of the seven participants contributed to this final theme that emerged from the dataset (See appendix E for additional quotes). Participant 1 reported:

> I don't feel like I am fatigued all the time. I still get up and at the same time as if I were going to work and jump in the shower. Then I get on with my day doing mostly desk work, what I call "light duty".

Participant 2 reported persistence by stating, "These symptoms don't limit me because I want to get my breath back, so I exercise."

In summary, this theme identified that for these participants, being persistent to continue performing physical activities they enjoy allows them to manage the symptoms of fatigue. Finding a balance between rest and being physically active is key in managing the cancer-related symptoms of fatigue. Time should be set aside for periods of rest, and it is important to conserve energy for the physical activities that are most important to the patient. Keeping track of the time of day that the patient feels best is the perfect time to engage in physical activities. It is recommended and safe for cancer patients to perform 150 minutes of moderate intensity PA per week.

Discrepant Cases

There were no identified discrepant cases in the results of the study, as no participants had views that differed from each other during the semi structured interviews. This was more than likely to be attributed due to all participants involved in

this study, meeting criteria required to participate. The criteria included: (a) having been diagnosed with lung cancer, (b) being male or female, 40 years or older, (c) resided anywhere in the United States and spoke English, and (d) performance status was either 0 or 1, according to the Eastern Cooperate Oncology Group (ECOG). There was no evidence of any abnormalities or outliers within the dataset.

Summary

The problem studied was that individuals experienced anxiety, depression, and fatigue after receiving a lung cancer diagnosis, which reduced their levels of psychological health and health-related quality of life (Eichler et al., 2018). Research had demonstrated that the relationship between PA and lung cancer was significant in relation to dealing with psychological distress (Agarwal et al., 2017; Eichler et al., 2018; Lehto, 2017); however, it was currently unknown when patients experienced the implementation of PA of being beneficial to their mental health (Mainini et al., 2016). Furthermore, individuals who had been diagnosed with lung cancer experienced symptoms such as coughing and shortness of breath, which increased levels of anxiety, depression, and fatigue (Lehto, 2017). Therefore, the purpose of this qualitative interpretive phenomenological analysis study was to explore the lived experiences of lung cancer patients on PA engagement and how PA was influenced by anxiety, depression, and fatigue.

This chapter reported this study's results. I began this chapter by providing an overview of the setting and the demographics that the participants presented with when participating in this study. I then provided an overview of how data were collected, and

how the analysis was conducted. I concluded this chapter with a discussion of how trustworthiness was maintained, the results of the study, and any identified discrepant cases. Within this study, eight themes emerged from the dataset that included: (a) being diagnosed with lung cancer created fear and left patients feeling scared, (b) distractions and keeping busy are important, (c) increased anxiety left patients feeling unmotivated to be physically active, (d) increased anxiety left some patients determined to keep being physically active, (e) depression left some patients feeling challenged to participate in PA, (f) depression increased some patient's determination and persistence to keep physically active, (g) fatigue negatively influenced some patients desire to be physically active, and (h) fatigue can be overcome with persistence to be physically active. The next chapter will conclude this study by providing a discussion of the results in relation to previous literature, implications, limitations, and recommendations for future studies.

Chapter 5: Discussion, Conclusions, and Recommendations

Patients with lung cancer experience elevated levels of psychological distress, but PA is recognized as a treatment protocol. This qualitative interpretive phenomenological analysis (IPA) study aimed to explore the lived experience of patients diagnosed with lung cancer and how PA was influenced by anxiety, depression, and fatigue. Eight themes emerged from the dataset: (a) being diagnosed with lung cancer created fear and left patients feeling scared, (b) distractions and keeping busy are important, (c) increased anxiety left patients feeling unmotivated to be physically active, (d) increased anxiety left some patients determined to keep being physically active, (e) depression left some patients feeling challenged to participate in PA, (f) depression increased some patient's determination and persistence to keep physically active, (g) fatigue negatively influenced some patients desire to be physically active, and (h) fatigue can be overcome with persistence to be physically active.

This chapter will conclude the study by providing a discussion of the results. Within this chapter, I will interpret the results concerning previous literature and both self-efficacy theory and the biopsychosocial model. I will then highlight the limitations experienced in this study and discuss the implications for organizations, individuals, families, and society; a discussion will also ensure that it depicts how positive social change can be promoted from the results of this study. I will then conclude this research by providing recommendations for future research.

Interpretation of the Findings

Eight themes emerged from the dataset that was guided by an overall research

question and three sub research questions:

- Overall RQ: What is the lived experience of lung cancer patients with the impact of psychological health on PA?
- RQ 1: How is PA influenced by anxiety?
- RQ 2: How is PA influenced by depression?
- RQ 3: How is PA influenced by fatigue?

This section will interpret the findings concerning previous literature and the conceptual framework that guided this study.

Theme 1: Being Diagnosed with Lung Cancer Created Fear and Left Patients Feeling Scared

The participants reported that being diagnosed with lung cancer created fear and left them feeling scared. The participants reported that their usual PA participation was placed on hold after their diagnosis simply because they were experiencing extreme feelings based on fear. Fear intensified the existing feelings from receiving a lung cancer diagnosis. The feelings of fear also increased psychological stress related to anxiety and depression. The participants reported that these feelings could change daily, hourly, or even from one minute to the next.

These results appear in previous research. Being diagnosed with lung cancer promoted intense experiences of psychological distress due to the initial shock of the diagnosis, during cancer treatment and the associated side effects, the persistent struggle with having a life-limiting disease, and experiences facing a progressive illness (Liao et al., 2018). Additionally, individuals diagnosed with lung cancer also reported having

increased distress levels (Ni et al., 2018). It is distress due to symptoms the symptoms of lung cancer that can promote physical and psychological hardships that include fatigue, nausea and vomiting, pain, and increased levels of anxiety and depressive episodes (Granger, 2016; Ni et al., 2018), all of which can affect PA levels.

Theme 2: Distractions and Keeping Busy are Important

The participants reported that distractions and keeping busy were necessary. This theme is also in alignment with previous literature that showed how women faced with incurable lung cancer relied on social support, focused on positive thinking styles, completed avoidance-based coping strategies, and followed a religious or spiritual path (Liao et al., 2018). Patients diagnosed with lung cancer should move away from destructive coping strategies and follow constructive and balanced coping strategies (Jankowska-Polańska et al., 2019). These strategies include self-distraction, positive reframing, religion, and acceptance. Additional research also reported that distractions and keeping busy provide physical and emotional coping mechanisms required for improving their overall health-related quality of life (Michaels, 2016).

Theme 3: Increased Anxiety Left Patients Feeling Unmotivated to be Physically Active

Within the third theme, the participants reported that increased anxiety left them unmotivated to be physically active. Early research had encouraged cancer patients not to be physically active when diagnosed with cancer; patients were advised to rest, recover, and just conserve their strength and energy to focus on receiving chemotherapy and not tax themselves too much. They were told to avoid engaging in any PA that could lead to

tiredness or exhaustion (Baumeister et al., 2020; Kong, Shin, et al., 2020; Johnsson et al., 2019). However, recent research has demonstrated the importance of PA after being diagnosed with lung cancer. For example, research has demonstrated that engaging in PA while receiving cancer treatments can lead to meaningful improvements in overall fitness, quality of life, treatment-related side effects, and psychological effects of anxiety, depression, and self-esteem (Dhillon et al., 2017; Peddle-McIntyre et al., 2019). But anxiety can lead to being unmotivated to engage in PA in addition to the wide range of severe symptoms (Peddle-McIntyre et al., 2019). Co-existing conditions can be aggravated, leading to poorer quality of life. At the same time, indirect or side effects of cancer treatment can commutatively make patients feel hopeless and demotivated to move. This can ultimately lead to the body's deconditioning and the patient's low PA capacity. Many cancer patients are not meeting the minimum weekly recommended PA levels (Granger et al., 2018). Therefore, this area needs to be examined in greater detail, as research has indicated that the more PA patients engage in, the greater their quality of life (Dhillon et al., 2017; Peddle-McIntyre et al., 2019).

Theme 4: Increased Anxiety Left Some Patients Determined to Keep Being Physically Active

The participants reported that feelings of increased anxiety left them determined to keep being physically active. Individuals in this study appeared to use PA as a coping mechanism, which helped them stay focused on caring for themselves, their emotions, and their physical health. Because lung cancer patients are increasingly surviving their diagnosis, PA regimens are paramount because they provide both physical and emotional

coping mechanisms required for improving their overall health-related quality of life (Michaels, 2016). In addition, one study highlighted different PA factors in cancer patients during their treatments and the results of the study highlighted that although patients can struggle at times to complete PA regimens, they are more influenced to participate in such regimens due to differing factors (Avancini et al., 2020). These factors have included medical advice, social support, enjoyment from PA, the ability to set personal goals, and whether they own an animal. It is essential to ensure that PA regimens are individualized to meet each patient's needs; this way, they can also experience an increase in motivation to complete Pas (Avancini et al., 2020).

Themes 5 and 6: Depression Left Some Patients Feeling Challenged or Determined to Participate in PA

Some of the participants in this study reported that their experience of depression increased their determination and persistence to keep physically active. The participants also reported that depression left them feeling challenged to participate in PA. Although there appeared to be limited research that supported this theme, some research had demonstrated alignment. In alignment with previous literature, Henshall et al. (2019) conducted a review to assess the evidence on the effects of PA on lung cancer survivors' fatigue, dyspnea, and depression risks. Henshall et al.'s study revealed that the PA interventions commonly offered to lung cancer survivors were pulmonary rehabilitation, aerobic exercise, resistance training, and balancing programs. However, these can be challenging for patients due to their lack of motivation to participate in PAs they typically find enjoyable (Frikkel et al., 2020). Additionally, in lung cancer patients, the treatment

of depression significantly improved the quality of their lives but did not necessarily improve their chances of survival (Mulick et al., 2018). However, the authors reported that it is imperative to improve one's quality of life, and depression should most definitely be considered when moving through the journey of a lung cancer illness, and PA can assist with this. Also, in alignment with the theme of increased determination when feeling depressed, the current literature on PA and lung cancer reiterates that PA is a non-pharmacological approach for several different pathologies due to the beneficial effects it has on the many different organs and tissues of the body increasing one’s overall state of health, including psychological health (Messina et al., 2022). PA in lung cancer treatment can reduce the bodies response to inflammation and increase the molecular signaling pathways to increase the bodies response to support muscle growth and increase metabolic adaptation. PA in lung cancer is an intervention that can help to lung function, fatigue, and increase the psychological state of the patient thus motivating them to keep active throughout the cancer journey.

In a past qualitative study, it was observed that lung cancer patients commonly experienced denial after the diagnosis which led to depression and leaving the patient questioning, why me? Or how can I live longer? (Zhang et al., 2022). One participant in this study found that while her family took diligent care of her, it left her feeling challenged to care for herself. Another participant stated that after self-reflecting about life before the diagnosis, led him to be motivated to change his lifestyle habits which included him becoming physically active on a regular basis.

Theme 7: Fatigue Negatively Influenced Some Patients' Desire to be Physically Active

Within this theme, the participants reported that fatigue negatively influenced their desire to be physically active. This theme appeared in alignment with previous literature. For example, a research study that focused on the impact PA could have on lung cancer patients, collected data from patients with advanced lung cancer by having them complete a two-month PA regimen (Dhillon et al., 2017). The results of Dhillon et al.'s study concluded that there were no significant differences in fatigue improvement because the patients could not properly increase their PA regimens appropriately.

In addition, another study discussed the importance of focusing on fatigue in lung cancer patients. The authors studied fatigue concerning depression and anxiety to determine how these constructs affected the health-related quality of their lives. The study's conclusion was that fatigue exerted stronger influences on the lives of lung cancer patients and their health-related quality of life (Jung et al., 2018). Therefore, the authors reported that focusing on fatigue was essential as this phenomenon appeared to negatively influence health-related quality of life, more so than depression and anxiety.

Theme 8: Fatigue can be Overcome with Persistence to be Physically Active

The eighth theme emerged from the dataset when the participants reported that fatigue could be overcome with persistence to be physically active. This theme appeared in alignment with previous research where it was argued that patients who had been diagnosed with lung cancer fared better when implementing PA into their treatment regiments, as PA assisted in achieving ideal body weight composition, while increasing

strength, mobility, and psycho-social well-being (Stefani et al., 2017). In addition, another study reported that lung cancer patients experienced fatigue and it was difficult for the patients and case workers to manage (Cheng et al., 2017). Completing a study that focused on this phenomenon, the authors found that providing acupuncture to individuals who experienced fatigue could improve symptoms, which could further help them in increasing PA levels. Finally, a completed a literature review synthesis was conducted to understand lung cancer fatigue concerning PA regimens, where the authors reported that although lung cancer survival rates were increasing, PA regimens could further help to improve the side effects of fatigue. The authors stated that more research is required in this arena, which was one of the studies that made this current research viable (Henshall et al., 2019).

Emergent Theme

There is one emergent topic worth mentioning in the dataset that presented itself when interviewing the participants for this study. This theme is, “weather interferes with the desire to get outdoors and be physically active”. Taking a walk at a moderate to high intensity pace can provide people with a tremendous health benefit. Most rewarding is that it is free, easy, and can be completed almost anywhere. Taking a walk anywhere also depends on the geographical area in which you live. Most older adults enjoy the PA of walking in scenic areas (e.g., the park). Lesser et al. (2021) reported that in the past decade, the literature has supported the idea that spending time in nature had a positive impact on psychological health. The psychological health benefits are in combination with the benefits experienced from PA. Cancer patient motivation and challenges

regarding outdoor PA participation have not been well studied. Additionally, there appeared limited research on the benefits of the PA environment and the psychological health benefits for cancer patients.

Self-Efficacy, the Biopsychosocial Model, and Findings

The results also appear in alignment with self-efficacy theory and the biopsychosocial model. In this study, the behavior and performance component of the self-efficacy theory would include a patient's level of PA. For example, participants in this study appeared to examine past experiences (e.g., past experiences with illnesses), vicarious experiences (e.g., modeling behavior by other lung cancer patients), social persuasion (e.g., coaching and feedback from the medical team), and their physiological and emotional states (e.g., anxiety, depression, and fatigue). From these lived experiences, the participants made self-efficacy judgments and completed a behavior. Therefore, these self-efficacy judgments drove the results, giving them perceptions and experiences about their cancer journeys.

Concerning the biopsychosocial model, the results are also in alignment. The results have highlighted that the entire body must be examined regarding lung cancer and PA. Within the biopsychosocial model, the mind and body are pervious to one another, and the biological organism is pervious to the psychological and social complexities of interactions within the realm of health (Suls et al., 2019). The biopsychosocial model considers the whole person through biological and psychological lenses and considers the individuals' social and environmental factors involved in the development of disease.

Limitations of the Study

Some limitations were identified within this study—the first including researcher bias. Researcher bias could have occurred in this qualitative study if I had allowed my perspectives, thoughts, values, and opinions to be injected into the survey (Gao, 2020). Therefore, to reduce any instances of researcher bias, I developed an interview protocol where I employed the assistance of a panel of experts who reviewed the semi structured interview questions to ensure that they aligned with the study's problem, purpose, research questions, conceptual frameworks, and methodology. The panel of experts consisted of three individuals I did not know personally and with similar professional and educational experiences as myself. After reviewing the semi structured interview questions, the panel members did not recommend any changes to the questions to bring them more substantial alignment. If any panel members would have identified any needed changes, I would have made the changes as recommended.

Another way that I dealt with researcher bias was by completing member checking. Member checking was a process where I had the study participants review the transcripts of their interviews to ensure that they reflected exactly what was said (Candela, 2019; Rose & Johnson, 2020). If any participants had reported inaccuracies in the interview transcripts, I would have made their recommended changes.

A second limitation of this study included a lack of generalization. Because this study focused on the diagnosis of lung cancer and how PA was influenced by anxiety, depression, and fatigue in individuals 40 years of age and older, those who lived in the United States, and those with a performance status of 0 or 1, the results may not be

generalizable to populations and geographical regions outside of these boundaries. Therefore, future research must be conducted to understand this phenomenon with other cancer diagnoses, different people, and geographical areas.

A final limitation could have included the COVID-19 pandemic. Because I started this study during the beginning of the COVID-19 pandemic, individuals may have experienced a change in their lifestyles and behaviors due to quarantine and social distancing measures that were implemented. Therefore, this could have influenced the results of this study to some degree.

Recommendations

Based on this study's limitations, recommendations for future research can be provided. The first recommendation is for future researchers to focus on a longitudinal study that can examine the effects of fatigue on lung cancer patients and their exercise over time. Because this study collected data over a single snapshot of time, future research could be completed that examines the experiences of fatigue, PA, and mental health over more extended periods. This can help us understand how experiences change over time.

A second recommendation is for future researchers to complete a quantitative study with larger sample sizes to make the results generalizable. Quantitative research could allow future researchers to collect larger datasets through surveys or questionnaires. In addition, quantitative analysis could enable future researchers to make predictions or understand relationships between the variables of lung cancer diagnosis, PA, anxiety, depression, and fatigue.

A final recommendation is that future research could focus on individuals' perceptions of lung cancer diagnosis, PA, anxiety, depression, and fatigue concerning the COVID-19 pandemic. Conducting a qualitative design would allow future researchers to understand how the COVID-19 pandemic has specifically influenced PA levels, and anxiety, depression, and fatigue when it comes to PA.

Implications

Some implications can be discussed due to this study's findings focusing on individuals, their families, organizations, and the wider community. From an individual level, the results of this study could assist individuals diagnosed with lung cancer so they not only understand the importance of PA but also how anxiety, depression, and fatigue could promote challenges. For other individuals, the experience of anxiety and depression has motivated them to participate in PA. Understanding these results could assist individuals diagnosed with lung cancer in understanding that these experiences can be typical and provide a framework for improving their PA levels.

Another implication is for family members. The results of this study could assist family members in providing more substantial support to their loved ones diagnosed with lung cancer. The results could help increase motivation and decrease any barriers identified when it comes to increasing PA levels. A final implication could be for organizations and healthcare providers. By understanding how depression, anxiety, and fatigue could influence PA levels, organizations and healthcare providers could develop PA interventions and programs more aligned with lung cancer patients' experiences. More robust PA interventions could be tailored to individuals by conducting a

biopsychosocial assessment of patients diagnosed with lung cancer. The results and previous research highlighted how every individual's journey differs when fighting cancer.

This study also heightened the importance of social justice. Because cancer patients present to treatment and aftercare with various demographic backgrounds, disease severity, and access to healthcare, this study promoted the importance of the biopsychosocial model and how it could be utilized to address all areas of a patient's life. By understanding how each patient individually experiences anxiety, depression, and fatigue within their cancer diagnosis and treatment, more robust and more effective PA interventions could be created that supports the different lifestyles of each patient.

Conclusion

The problem that was studied was that lung cancer patients experience anxiety, depression, and fatigue after receiving a lung cancer diagnosis and beginning the treatments associated with the diagnosis, which reduces their levels of psychological health. Therefore, this qualitative IPA study aimed to explore the lived experience of patients diagnosed with lung cancer and how PA was influenced by anxiety, depression, and fatigue. Within this study, eight themes emerged from the dataset that included: (a) being diagnosed with lung cancer created fear and left patients feeling scared, (b) distractions and keeping busy are important, (c) increased anxiety left patients feeling unmotivated to be physically active, (d) increased anxiety left some patients determined to keep being physically active, (e) depression left some patients feeling challenged to participate in PA, (f) depression increased some patient's determination and persistence to

keep physically active, (g) fatigue negatively influenced some patients to desire to be physically active, and (h) fatigue can be overcome with persistence to be physically active.

This chapter concluded the study by providing a discussion of the results. Within this chapter, I interpreted the results concerning previous literature and both self-efficacy theory and the biopsychosocial model. I then highlighted the limitations experienced in this study and discussed the implications for organizations, individuals, families, and society; a discussion also ensued that depicted how positive social change could be promoted from the results of this study. I then concluded this research by providing recommendations for future research. By focusing on cancer patients' anxiety, depression, and fatigue and how they experience these limitations and barriers within their cancer diagnosis and treatment journey, more robust PA interventions could be created to increase their well-being from both psychological and physical standpoints.

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Appendix A: Eligibility Questionnaire

Please complete this eligibility questionnaire. It would help if you answered each question accurately and honestly. The researcher will not reveal any personal information in the study's results.

1. Please indicate your age (40 years or older):
2. Do you reside in the United States?
3. Do you speak and read the English language?
4. According to the ECOG PERFORMANCE STATUS, is your performance status either 0 or 1? (Refer to grades below).

Grade 0 Fully active, able to carry on all pre-disease performance without restriction.

Grade 1 Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light housework, office work.

Grade 2 Ambulatory and capable of all self-care but unable to carry out any work activities: up and about more than 50% of waking hours.

Appendix B: Semi structured Interview Questions

1. Can you describe your thoughts after being diagnosed with lung cancer?
2. What did receiving a lung cancer diagnosis mean to you?
3. What does anxiety mean to you?
   3a. How does anxiety affect your motivation to engage in PA?
4. Tell me about any physical symptoms influenced by anxiety.
   4a. How do these symptoms limit you from engaging in PA?
5. Can you describe your daily routine and talk about when you feel the least anxious?
6. What does depression mean to you?
   6a. How does depression affect your motivation to engage in PA?
7. Can you describe any physical symptoms influenced by depression.
   7a. How do these symptoms limit you from engaging in PA?
8. Can you describe your daily routine and talk about when you feel the least depressed?
9. What does fatigue mean to you?
   9a. How has fatigue influenced your motivation to engage in PA?
10. Can you describe the physical symptoms influenced by fatigue.
    10a. How do these symptoms limit you from engaging in PA?
11. Can you describe your daily routine and talk about when you feel the least fatigued?

Appendix C: Additional Quotes

Theme 1: Being diagnosed with lung cancer created fear and left patients feeling scared.

"I cried and screamed all the way home. I was alone in the car" (Participant 2, female).

"It was hard it was really hard. I screamed, I cried, I just couldn't believe it." (Participant 7, female).

Theme 2: Distractions and keeping busy are important.

"When I'm working with my son and trying to show him ropes to the business." (Participant 1, male).

"I just get up and go with the day. I just have to stay busy, always doing something." (Participant 5, male).

"Yes, when I am working on my jewelry projects. That's when I feel really good because I don't have to do any walking." (Participant 6, female).

"Probably in the morning because I was always busy with tests and stuff. The other day a friend came over and took me to breakfast and that was wonderful. I felt good maybe because I got to get out and away from the house." (Participant 7, female).

Theme 3: Increased anxiety left patients feeling unmotivated to be physically active.

"It has slowed me down." (Participant 5, male).

"I can't walk very far. I have to wear oxygen which I also did before, but now I have to wear it all day every day. And um, I do get bouts of asthma you can hear it in my throat." (Participant 6, female).

Theme 4: Increased anxiety left some patients determined to remain physically active.

"The more activity I do the less anxious I am. There has been a direct correlation between the two my whole life. Before the covid, I use to go to the gym a couple of times a week. I was able to keep my anxiety in check until the covid hit and that was the first time I actually needed medication to get it under control. So that was really like, okay we are going to get through this. I think there was some denial involved, like I don't really have cancer, I have this thing that needs to come out. But that is how I function generally, it's okay let's just deal with the situation and do what I have to do to get past this." (Participant 4, female).

Theme 5: Depression left some patients feeling challenged to participate in PA.

"I cry a lot when I can't go to the grocery store, or I can't go out and do things with friends because I am sick all the time." (Participant 6, female).

Theme 6: Depression increased some patients' determination and persistence to keep physically active.

"I don't know that I can say that I have signs of depression or if I have ever been depressed, even in light of the cancer diagnosis. I'm in the best place that I can possibly be and I'm going to stay as healthy as I can be." (Participant 4, female).

"I don't let it affect me." (Participant 5, male).

Theme 7: Fatigue negatively influenced some patient's desire to be physically active.

"It means I'm tired, I'm tired, I'm listless, and I have to take naps all the time." I don't get enough oxygen, I am on two liters, but I don't get enough PA to increase my oxygen uptake, so I don't have any energy." (Participant 6, female).

"I am always tired. I do not sleep well at all, ever since the cancer I don't want to do anything. I don't have the ambition to do anything. I don't like that about me. I am usually outgoing I like to go out gambling or just do things." (Participant 7, female).

"Since my lung surgery, I get out of breath when I walk up a ramp or walk up the stairs. I get out breath sometimes just standing around and talking a lot." (Participant 2, female).

"I wasn't going to do anything. The only thing that motivated me was my bed." (Participant 3, female)

Theme 8: Fatigue can be overcome with persistence to be physically active.

"When I was in treatment I was out and about every morning so then I could just continue throughout the day. I would just start my day there and get everything done all at once and then come home in the afternoon. If I was tired, I would take a nap and if I wasn't, I wouldn't." (Participant 3, female).

"It doesn't influence my motivation. I am running all day and still work full-time. People have to threaten to tie me to a chair to slow down." (Participant 4, female).

"My daily routine is the same. I have coffee, play cribbage with friends, and daily chores, that's it. I hang out with the grandkids stuff like that. I just have to stay busy, always doing something." (Participant 5, male).