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The Role of Psychological Distress in Maintaining Exercise After Cancer Diagnosis

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Abstract

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MPH, University of Southern California Keck Medical School, 2015

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Cancer affects the lives of thousands of people every day and is a leading cause of death. Exercise has been shown to yield mental and physical benefits for patients and survivors, but the experiences of cancer patients who face a multiplicity of psychological stressors have not been clearly described. The purpose of this qualitative study was to understand the psychological factors that are associated with continuing to exercise after cancer diagnosis, during and/or following their treatment. The focus was on how cancer survivors maintained a regular routine of exercise while experiencing psychological distress associated with cancer diagnosis, treatment, and concerns about recurrence. The qualitative research design featured an in-depth interview process with semistructured interviews and open-ended questions. Interviews were analyzed using the thematic analysis outlined by Braun and Clarke. The health belief model, theory of reasoned action, and theory of planned behavior provided the foundation for the generation of interview questions and subsequent qualitative analysis. Thematic analysis of participant responses yielded five themes: (a) downside of not exercising, (b) benefits of exercising, (c) motivators to exercise, (d) impediments to exercise, and (e) attitudes towards exercise. The participants' experiences highlighted the physiological and psychological stress of cancer diagnosis, treatment, and survivorship, as well as the mental-emotional and motivational factors supporting their continuing to exercise. This knowledge could lead to positive social change for other cancer survivors who would like to adopt and maintain this health behavior as well as health care professionals who provide care and want to further their understanding of the experiences of cancer patients.

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Chapter 1: Introduction to the Study

In 2021, the estimated number of new cancer cases, in the United States alone, was 1,898,160, with 608,570 of these cases projected to result in death (American Cancer Society, 2021). There are a number of lifestyle-related factors that can increase one's risk for cancer, including having obesity, eating unhealthy foods, not exercising, smoking, and abusing alcohol (American Cancer Society, 2021). Additionally, chronic exposure to ultraviolet light; infection with certain viruses such as the human papilloma virus (HPV); and exposure to air pollution, radon, chemicals, or radiation can contribute to cancer development (American Cancer Society, 2021).

There has been much research on the psychological impact that cancer diagnoses and treatment can have on individuals. A cancer diagnosis is a major life-changing event, and feelings of depression and anxiety, as well as fear, are common not only for the affected individual, but also for family members and caregivers (American Cancer Society, 2021). Several studies report that patients with cancer suffer from psychological distress; however, the concept of cancer-related psychological distress has not been clearly described (Gundelach & Henry, 2016). Research shows that cancer-related psychological distress is associated with depression, anxiety, fear, and feeling discouraged, however (Gundelach & Henry, 2016). These negative feelings can be overwhelming and further weaken an already compromised immune system (Gundelach & Henry, 2016). Although a lack of motivation is common in those who have been diagnosed with cancer, there is also evidence that some who face this challenging life change have been able to overcome negative feelings and actually become or stay physically active.

The knowledge from this study may be pertinent to individuals who want to adopt and/or maintain physical activity and other health behaviors. Findings may bolster patients' self-efficacy. Research on the psychological impacts of cancer diagnoses and treatment on patients may also enable health care professionals to prescribe more apt and tailored treatments that improve patient outcomes (American Cancer Society, 2021. In this chapter, I examine how cancer is impacting society and how psychological factors play an important role in patients' response to cancer diagnosis, treatment, and survival. The chapter also includes an overview of the study, including the purpose and problem statement, research question, theoretical framework, nature of the study, and key definitions. I also discuss the assumptions, scope and delimitations, limitations, and significance of the study.

Background

Each year there are about 1.9 million new cases of cancer in the United States and an estimated 608,570 diagnosed individuals die from cancer, while the annual medical cost is about $208.9 billion (National Cancer Institute, 2021). An estimated 1.9 million new cancer cases were expected to be diagnosed in 2021, with around 608,570 Americans expected to die from these cancers (American Cancer Society, 2021. This means that about 1,667 deaths will occur per day in 2021. Cancer is now the second most common cause of death in the United States, surpassed only by heart disease (American Cancer Society, 2021).

A cancer diagnosis can be psychologically traumatizing for those impacted. Self-esteem, changes in body image, self-confidence, limitations in daily functioning, and altered family and work dynamics all play a role in the development of psychological distress that can accompany a cancer diagnosis (Greenblatt & Saini, 2019). Reactions to cancer diagnoses are further impacted by variations in age of patients and the existence of a social support network, or the lack thereof. Psychological distress can manifest itself in depression, anxiety, posttraumatic stress disorder, and feelings of loneliness and desperation (Greenblatt & Saini, 2019).

Additionally, research suggests that suicide rates among cancer patients are as much as one and a half times higher than in those without cancer (Amiri & Behnezhad, 2019). The emotional reactions cancer patients face can vary depending upon where they are in the process. For example, studies suggest that the fears related to mortality are often greatest at the time of diagnosis (Greenblatt & Saini, 2019). For adolescents, it is difficult to process the threat to their identity, as youth is usually accompanied by feelings of invincibility. Findings indicate a state of disbelief for many adolescents who are diagnosed with cancer, not having considered the possibility of having this disease, that in their mind comes with being older (Greenblatt & Saini, 2019). Nevertheless, experiencing a cancer diagnosis has shown to accelerate maturity levels among adolescents due to the trial of facing cancer (Greenblatt & Saini, 2019).

Research has shown that exercise can be beneficial for those facing cancer by functioning as a coping mechanism, reducing stress, improving immune function, instilling self-confidence, and elevating mood (Baum et al., 2011). Maintaining physical fitness after cancer is linked with minimizing adverse effects and increasing survival rates. It may also be related to an improvement in bone mineral density, self-esteem, elevated mood, and increased mobility (Hsu et al., 2012). Physical activity is linked to a reduction of recurrence of some cancers and an improvement in cardiovascular health. There is evidence of a decrease in posttreatment fatigue (Tsai et al., 2018). In one study, a regular schedule of physical activity resulted in an elevated quality of life evident in improved mood, fitness, and lower rates of cancer and treatment associated symptoms among cancer survivors (Packel et al., 2015). In another, improvements in fitness, muscular endurance, and strength were observed among cancer patients who maintained an exercise program despite cancer (Drake et al., 2004). Qualitative interviews of women with breast cancer show that they felt better mentally and physically when exercising (Hsu et al., 2012).

However, a lack of motivation and energy is also common among cancer patients. Initiation and maintenance of exercise can be challenging due to multiple factors. Even for the general population it is difficult to maintain a regular exercise program but doing so after cancer diagnosis can be considerably more challenging due to the psychological trauma and adverse effects of certain treatments such as chemotherapy (Hsu et al., 2012). It is common for cancer patients not to adhere to prescribed levels of physical activity (Tsai et al., 2018). Despite an awareness of the benefits of exercise, many patients feel unable or disempowered to participate in physical activity (Yang et al., 2017). Yet, despite these frequent challenges, there are those who have been diagnosed with cancer who are able to maintain an exercise routine. Findings suggest that higher efficacy for scheduling activity is associated with a greater likelihood to exercise (Tsai et al., 2018). Furthermore, patients or survivors who have an intrinsic desire to exercise, or who had an exercise routine prior to their cancer diagnosis, are more likely to adhere to a long-term exercise program, research shows (Tsai et al., 2018). In this study, I examined factors that may serve as barriers or facilitators to exercise maintenance among cancer patients and survivors.

Problem Statement

In 2021, the estimated number of new cancer cases in the United States alone was 1,898,160, with 608,570 of these cases projected to result in death (American Cancer Society, 2021). There are a number of lifestyle-related risk factors that can lead to cancer, including having obesity, eating unhealthy foods, not exercising, smoking, and abusing alcohol (American Cancer Society, 2021). Additionally, chronic exposure to ultraviolet light; infection with certain viruses such as the human papilloma virus; and exposure to air pollution, radon, chemicals, or radiation can lead to cancer development (American Cancer Society, 2021).

There has been much research on chronic stress due to cancer and its psychological impacts. A cancer diagnosis is a major life-changing event, and feelings of depression, anxiety, as well as fear are common for the affected individual, but also for a patient's family and caregivers (American Cancer Society, 2021). Several studies report that patients with cancer suffer from psychological distress; however, the concept of cancer-related psychological distress has not been clearly described (Gundelach & Henry, 2016). Cancer-related psychological distress is associated with depression, anxiety, fear, and feeling discouraged (Gundelach & Henry, 2016). These negative feelings can be overwhelming and further weaken an already compromised immune system. Although a lack of motivation is common in those who have been diagnosed with cancer, there is also evidence that some who face this challenging life change have been able to overcome negative feelings and actually become or stay physically active.

Robinson et al. (2017) examined the motivational factors influencing breast cancer survivors to participate in triathlon training. Their findings highlight that breast cancer survivors who participated in triathlons recognized that they needed to change their way of life and become physically more active. Additionally, breast cancer survivors in the study were more likely to engage in this activity when they were in a group with other survivors. Although this study addresses an important concern relating to exercise, it is important to note that triathlons are a very unique type of exercise that would prove difficult even for healthy individuals. Therefore, this information is not easy to generalize to a greater population. In this study, I focused on exercise that may be more practical for cancer survivors, such as power walking, jogging, swimming, or resistance training (i.e., moderate weight use, resistance bands, or isometric exercise).

Trudel-Fitzgerald et al. (2018) examined whether higher distress in the form of anxiety and depression is associated with lower likelihood of engaging in healthy behaviors after colorectal cancer diagnosis. Their research findings suggest that higher anxiety and depression were significantly related to unhealthier lifestyle scores throughout their follow-up over time. In addition, the findings may indicate that treating psychological symptoms of individuals who have been diagnosed with cancer may not only reduce psychological distress but also promote healthy behaviors, which includes physical activity.

Endrighi et al. (2016) examined the predictors of exercise in female endometrial cancer survivors who all received an exercise intervention. The authors mentioned that physical activity is beneficial for individuals who have been diagnosed with cancer, yet exercise participation is low in this group. The results of this study showed that those who had more positive feelings toward exercising prior to their cancer diagnosis displayed greater exercise self-efficacy prospectively. Based on this information, self-reported cognitions and implicit cognitions could be useful for intervention development and predicting risks for failing to exercise (Endrighi et al., 2016).

Research findings make it clear that cancer patients face significant stressors and battle with symptoms of depression and anxiety. It is also clear that exercise provides health benefits for those who maintain a level of physical activity, but the experiences of cancer patients who face a multiplicity of psychological stressors have not been clearly described, according to my review of the literature. In this study, I explored individuals' experiences during this difficult time in life to address this gap in the literature.

Purpose of the Study

The purpose of this qualitative study was to examine the psychosocial factors that may underlie why cancer patients continue or fail to continue to exercise during and following their treatment. I analyzed attitudes toward, and experiences of, exercise despite the traumatic experience of cancer diagnosis, treatment, and fear of recurrence. Psychological distress can manifest itself as signs of sadness, anxiety, distraction, and symptoms of mental illness. Depression, feelings of loneliness, and even posttraumatic stress disorder can become part of the daily experiences of cancer patients and survivors (Greenblatt & Saini, 2019). Cancer diagnosis leads to psychological distress and often impacts the quality of life, as well as daily functioning in such areas as finances, family, sexuality, spirituality, and more (Gundelach & Henry, 2016).

However, despite these stressors there are those cancer survivors who are able to maintain an exercise routine. This study adds to the understanding of how cancer survivors describe their experience of the myriad stressors, thoughts, and feelings that accompany their cancer diagnosis and treatment and the potential role such factors may have played in their maintaining (or initiating) exercise during and following treatment (Robinson et al., 2017). I focused on the experiences of cancer patients and survivors who were able to continue to engage in physical activity or who were able to maintain a regular exercise program after cancer diagnosis.

Research Question

What is the role of psychological factors in cancer patients' continuing to engage in exercise after cancer diagnosis?

Theoretical Framework

The health belief model (HBM) is one of the most widely used conceptual frameworks in health behavior research (Glanz et al., 2008). This model can be used to highlight the motivational factors in those who regularly exercise and those who do not. In the case of this study, what was of particular interest was the concept of self-efficacy to understand the convictions of cancer survivors who maintained a regular exercise routine. Motivation to adhere to an exercise routine is rooted in a desire to be healthy and self-actualized (Wood, 2008). In addition to self-efficacy, the HBM is built upon the constructs of perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Glanz et al., 2008). There is a positive association between perceived self-efficacy, commitment to action, and execution of behavior (Wood, 2008). Also, in the context of the HBM an individual's motivation to exercise will be influenced by the threat-assessment of cancer and the perceived value of following an exercise routine to reduce this perceived threat, compared to the perceived benefit. Research has shown that among the theoretical factors making up the HBM, perceived barriers are one of the most powerful predictors of exercise adherence (Woods, 2008).

The theory of reasoned action (TRA) and the theory of planned behavior (TPB) provide further insight into the association between attitudes, intentions, and behaviors, highlighting individual motivational factors that lead to the execution of specific behaviors such as exercising (Glanz et al., 2008). In this case, attitude is linked to a patient's feelings about exercising after cancer diagnosis, during treatment, or thereafter. Social norms are associated with how family, friends, and loved ones will perceive and support an exercise routine during this time. Perceived behavior control is defined as a patient's self-confidence and belief that they can accomplish their goal of exercising despite facing the threat of cancer (Packel et al., 2015). TRA focuses on behavioral intention as the crucial component of adopting health behaviors. This intention is determined by attitude toward the behavior and the subjective norm related to the behavior (Glanz et al., 2008). TPB is based on the individual's perceived control over the behavior (Glanz et al., 2008). In trying to understand the role of psychological distress in cancer survivors who maintained a regular exercise routine, I found it essential to assess what influenced their behavior. A person’s decision to perform or not to perform a particular behavior, such as maintaining an exercise program even during intense psychological distress, is linked to a strong intention towards action, as well as their knowledge, skill, experience, and freedom to perform the intended behavior (Glanz et al., 2008).

Hence, I expected that the experiences of cancer survivors would highlight their attitudes, intentions, feelings, decision-making processes, and abilities to function across different life domains. Intention to exercise is associated with a positive attitude toward fitness and the ability to attempt the activity. If a cancer patient or survivor has a greater level of intention to perform in a regular exercise program, then they are more likely to follow such an activity. A strong intention of cancer patients to be physically active should be linked to a greater probability of following a regular exercise routine (Packel et al., 2015). Exercise behavior is connected to perceived behavioral control or ability to execute the behavior. There is a need for significant incentive for cancer survivors to change behavior and adhere to an exercise routine (Woods, 2008). TRA/TPB are founded in cognitive processing and could be directly linked to the information received through the interviews of the current study. Therefore, the use of these frameworks in conjunction with data analysis assisted in discerning the thought and decision-making process of study participants.

Nature of the Study

I used a qualitative, nonexperimental research design including in-depth, face-to-face interviews. In line with qualitative research, I examined behavior and attitudes through a theoretical lens (see Creswell, 2009). The aim was to understand the experience of individuals who developed cancer and continued to follow an exercise routine. The interviews allowed for a meaningful understanding of the experience of these patients and survivors. In qualitative research, the aim is to discover and describe what people do and what can be learned about these particular actions (Ravitch & Carl, 2016). In this study, I explored cancer-related psychological distress and its potential impact on exercise habits through in-depth interviews.

I conducted semistructured, in-depth interviews to gather data on the experience of cancer patients and survivors, highlighting psychological factors in those who continue to engage in exercise. The interviews were conducted on an individual basis. The focus was on the thoughts, feelings, and behaviors of participating cancer patients and survivors. This approach allowed for more detailed information on individual experiences in a relaxed atmosphere. Interviews were recorded for later review and transcription (see Boyce & Neale, 2006).

Definitions

Anxiety: Worry, fear, or stress that can be felt on occasion or that is as extensive constituting a generalized anxiety disorder as defined in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5;* American Psychiatric Association [APA], 2013).

Cancer survivor: A person who remains alive and continues to function throughout and beyond diagnosis of the life-threatening disease of cancer. The term applies from the point of cancer diagnosis until the cessation of life (National Cancer Institute, 2019).

Cancer treatment: Any procedure to treat cancer, including surgery, chemotherapy, radiation therapy, targeted therapy, immunotherapy, stem cell or bone marrow transplants, or hormone therapy (American Cancer Society, 2019).

Exercise: Physical activity that engages the muscular system and cardiovascular system beyond the person's average activity for at least 30 minutes. For the purpose of this study, exercise can include any variant of physical activity that someone who is limited by the effects of cancer can engage in, such as power walking, jogging, swimming, calisthenics, or resistance training (i.e., moderate weight use, resistance bands, or isometric exercise).

Feelings of depression: Feelings that range from occasional sadness, low moods, to major depressive disorder as identified in the *DSM-5* (APA, 2013).

Psychological distress: Depression, anxiety, fear, and/or feelings of discouragement (Gundelach & Henry, 2016).

Stressors: Stimuli that cause perceived stress.

Assumptions

I assumed that participants would answer questions honestly and provide their own unique perspective of experiencing cancer. I also assumed that cancer diagnosis, treatment, and survivorship were accompanied by psychological distress (Gundelach &

Henry, 2016). Additionally, it was assumed that cancer patients who maintained a regular exercise routine would experience health benefits and that their experiences would reflect this in a degree of positivity (Edenfield & Blumenthal, 2011). I believed that patients who experienced greater feelings of sadness, extending all the way to major depressive disorder, would have experiences that were marked by more negativity, lack of motivation, and a lack of physical activity (APA, 2013). Furthermore, I assumed that participant recruitment via a social network (i.e., Facebook) would yield a variety of demographics within the selection criteria. The semistructured interviews consisting of open-ended questions were assumed to allow participants to freely express themselves within the focus of the study.

Scope and Delimitations

The scope of this study was shaped by the inclusion criteria for participants. To be eligible, participants had to meet the following criteria:

- diagnosed with cancer but might not have started treatment or might have chosen to decline treatment,
- were at least 18 years of age,
- had an exercise routine for at least 2 months prior to cancer diagnosis that consisted of at least one weekly exercise session that lasted at least 30 minutes,
- maintained this activity up to or beyond cancer diagnosis or did not discontinue exercising for more than one month before cancer diagnosis,
- had fluent English proficiency,

- agreed to sign an informed consent form, and
- were willing to participate in a semistructured, in-depth interview and be recorded.

The criteria limited recruitment. Additionally, due to the COVID-19 pandemic adjustments had to be made to the recruitment process, limiting it to surveys via internet, communication via videoconferencing, or telephone. Although these methods had advantages, they also presented some challenges or disadvantages. Online activity excluded those who do not have internet, a compatible device, and the ability or the knowledge on how to operate in this forum (Creswell, 2009). The Federal Communications Commission (2020) reported that approximately 19 million Americans did not have access to the internet in 2020

Limitations

Limitations included the Covid-19 pandemic in-person recruitment restrictions. Therefore, I had to use Facebook as a platform for recruitment, which could have led to a sample that included participants who have some college education, access to internet, and a level of social support. The study excluded those who did not have cancer, limiting the experiences of psychological distress to those who had been impacted by cancer. Furthermore, the data gained were based on the subjective experiences of participants, which limits the study’s generalizability. However, the emerging themes over multiple interviews highlighted the commonalities. In Chapter 4, I provide information on these commonalities and other findings from the study.

Significance

In 2021, there were over 19.3 million new cancer cases recorded in the United States, and out of these 10 million resulted in death (American Cancer Society, 2021). Current research findings suggest that by 2040 there will be a global burden of approximately 28 million new cases and 16.3 million deaths (American Cancer Society, 2021). Understanding the experiences of cancer patients and the psychological factors involved may improve the ability of health care professionals to assist them during this difficult part of their lives—for instance, by enhancing their ability to prescribe and tailor apt treatment (American Cancer Society, 2021). Additionally, insight on patients' experiences could assist others who are suddenly impacted by the life-changing event of cancer diagnosis. An improvement in patient self-efficacy as well as the enhancement of effective treatment can contribute to positive social change.

Furthermore, the perspectives of cancer patients may provide a better and more comprehensive picture of how psychological distress and motivation towards physical activity are associated. The theoretical frameworks of HBM, TRA, and TPB provided a framework to identify the emerging themes from the study's data (see Glanz et al., 2008). A better understanding of the psychological factors associated with the experiences of cancer patients may allow cancer patients to better cope with the associated stressors that are linked to cancer and health care professionals to help patients in these efforts.

Summary

Cancer impacts a significant part of society, both in the United States and globally. The American Cancer Society (2021) anticipated over 1,898,160 new cancer cases in the United States would be diagnosed in 2021 and that of these cases 608,570 would lead to death. Additionally, in 2020 $1208.9 billion were spent on cancer treatment worldwide, and the anticipated cost for 2020 is $150 billion and the anticipated cost for the year 2021 is $210 billion (American Cancer Society, 2021). Yet, research findings show that physical exercise is a low-cost strategy to improve health, reduce anxiety, depression, and improve quality of life without medication (Gimenez-Meseguer & Tortosa-Martinez, 2015).

Additionally, individuals who are self-sufficient and maintain a regular exercise routine, despite the psychological distress they experience after cancer diagnosis, tend to have better health outcomes than those who do not (Hsu et al., 2012). Furthermore, exercise has been shown to not only yield physiological benefits for cancer patients and survivors but also psychological improvements (Packel et al., 2015). Hence, just as the disease itself attacks one's physiology, a person's mind and emotion can also become compromised after cancer diagnosis, which can further weaken the immune system thereby making the body more vulnerable. At the same time, the effect of exercise can both positively impact the mind and body, counteracting the deleterious cascade of cancer (Baum et al., 2011). In this chapter, I introduced the study, the problem, and purpose, as well as the associated background, the theoretical framework, and the nature of the study. Chapter 2 will include a literature review of studies related to the subject at hand.

Chapter 2: Literature Review

Introduction

The second leading cause of death in the United States is cancer, which is only surpassed by heart disease (Centers for Disease Control and Prevention, 2016). As such, cancer is a major public health problem. In 2019, the number of Americans expected to die from cancer was estimated at 606,880, that is 1,700 deaths per day (Siegel et al., 2019). The risk factors associated with cancer have long been a focus and concern for the scientific community. Lifestyle and other risk factors include obesity; a poor diet; inactivity; tobacco use; overindulgence in alcohol; and repeated exposure to ultraviolet light, viral infections, air pollution, or radiation (American Cancer Society, 2018). The impact of a cancer diagnosis and the stress associated with cancer treatment, as well as the anxiety of cancer recurrence, are often overwhelming for cancer patients and survivors (APA, 2013). Depression, anxiety, and fear are common following the life-changing event of a cancer diagnosis (American Cancer Society, 2018).

Cancer-related psychological distress is a significant and additional burden on cancer patients and survivors (Gundelach & Henry, 2016). Surges of negative feelings (e.g., sadness, discouragement, panic, and dread) can further compromise an individual's immune system leaving them more vulnerable to pathogens and less likely to recover from compromise. The risk for psychological distress manifested in depression can extend many years beyond diagnosis. For example, a study by Kuba et al. (2019) showed that in hematologic cancer survivors, depression scores remained high for up to 26 years after diagnosis, with younger and middle-aged survivors having the greatest risk for psychological impairment. Additionally, cachexia increases patient morbidity and mortality (Hardee et al., 2017).

Research findings suggest that exercise training improves mental health (Gutman & Nemeroff, 2011) and prevents cachexia (Hardee et al., 2017) while yielding additional physiological and psychological benefits (Edenfield & Blumenthal, 2011). Yet, motivation to continue or to start exercise during particularly stressful times in life such as navigating cancer diagnosis and treatment can often be low (APA, 2013). Nevertheless, some individuals manage to maintain an exercise routine. In this chapter, I review current research related to exercise, cancer, and experiences of psychological distress among cancer survivors. Overviews of the literature search strategy, theoretical framework, and key concepts are also included.

Literature Search Strategy

I searched for peer-reviewed literature, focusing on studies published within the last 5 years, using Walden University Library databases. These included PsycArticles, PsycINFO, SAGE Journals, MEDLINE, ProQuest, PubMed, and EBSCOhost. I also used Google Scholar. Keywords used to identify relevant literature included *cancer*, *psychological distress*, *depression*, *exercise*, *immune system*, *stress*, *cancer diagnosis*, *cancer treatment*, *health belief model*, *theory of reasoned action*, *theory of planned behavior*, *physical activity*, *cancer-related*, and *cancer management*.

Theoretical Framework

Although the HBM is most widely used in a preventative context (Glanz et al., 2008), it can also be practical in gaining understanding about motivational factors that have helped those who maintained a regular exercise program retrospectively. HBM highlights concepts of self-efficacy, which is at the core of overcoming the barriers to exercise during cancer treatment (Glanz et al., 2008). Research findings show that self-efficacy and positive perceptions of exercise are significant determinants of whether individuals will engage in physical activity while undergoing disease treatment (Gorczynski & Vancampfort, 2018).

Additionally, negative emotions have been identified as barriers to physical activity and exercise. HBM also helps to understand that simply knowing that physical activity has physiological benefits is not sufficient as a motivating factor for engaging in exercise, while overcoming or managing barriers to exercise seems to be very relevant to engaging in physical activity (Gorczynski & Vancampfort, 2018). The theoretical framework of HBM includes the components of perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Glanz et al., 2008). These concepts were helpful in clarifying the reasoning and experiences of cancer survivors who maintained a regular exercise program.

The review by Husebo et al. (2013) suggested that exercise can be an important adjunct for cancer patients receiving treatment. The purpose of their research was to provide an overview of factors influencing adherence to exercise interventions in cancer populations. Their findings suggest that only half of cancer patients adhere to recommended exercise programs. Evidence indicates that those who have engaged in regular exercise over an extended period of time have a higher probability for exercise adherence during cancer. Although most cancer patients decrease their level of exercise after being diagnosed with cancer, those who manage to attain or maintain a more positive attitude towards physical activity increase adherence to exercise intervention programs (Husebo et al., 2013).

Graham et al. (2006) examined the impact of colon cancer on exercise motivation, using a protective motivation theory framework. Colon cancer is among the most prevalent cancers worldwide, ranking third with 1.8 million new cases in 2018 (American Institute for Cancer Research, 2018). Graham et al. referenced findings that show dose-response effects of exercise on colon cancer risk, when individuals participated in physical activities that were at least moderated in intensity. The researchers sought to identify whether the knowledge of the positive benefits of exercise, especially in regard to colon cancer prevention, would be a motivational factor to help subjects to have a regular exercise routine. Their findings showed that colon cancer prevention is an effective exercise motivation. Furthermore, Graham et al. stated that their findings reinforce the positive impacts of health interventions associated with self-regulation (i.e., coping resource appraisal, goal intentions) improving coping mechanisms, intentions, and behavior.

The TRA and the TPB are theoretical frameworks that provide further insight into the association between attitudes, intentions, and behaviors, highlighting individual motivational factors that lead to the execution of specific behaviors such as exercising (Glanz et al., 2008). In this case, attitude is linked to a patient’s feelings about exercising after cancer diagnosis, during treatment, or thereafter. Social norms are associated with how family, friends, and loved ones will perceive and support an exercise routine during this time. Perceived behavior control is defined by a patient's self-confidence and belief that they can accomplish their goal of exercising despite facing the threat of cancer (Packel et al., 2015). TRA focuses on behavioral intention as the crucial component of adopting health behaviors. This intention is determined by attitude toward the behavior and the subjective norm related to the behavior. TPB is based on the individual's perceived control over the behavior (Glanz et al., 2008). In trying to understand the role of psychological distress in cancer survivors who maintained a regular exercise routine, assessing what influenced their behavior will be pivotal. A person's decision to perform or not to perform a particular behavior, such as maintaining an exercise program even during intense psychological distress, is linked to a strong intention towards action, as well as their knowledge, skill, experience, and freedom to perform the intended behavior (Glanz et al., 2008).

Hence, I expected that the experiences of cancer survivors would highlight their attitudes, intentions, feelings, decision-making processes, and abilities to function across different life domains. Intention to exercise is associated with a positive attitude toward fitness and the ability to attempt the activity. If a cancer patient or survivor has a greater level of intention to perform in a regular exercise program, then they are more likely to follow such an activity. A strong intention of cancer patients to be physically active should be linked to a greater probability of following a regular exercise routine (Packel et al., 2015). Exercise behavior is connected to perceived behavioral control or ability to execute the behavior. There is a need for significant incentive for cancer survivors to change behavior and adhere to an exercise routine (Woods, 2008). TRA/TPB are grounded in cognitive processing and can be directly linked to the information received through the interviews of the current study. Therefore, the use of these frameworks in conjunction with data analysis assisted in discerning the thought and decision-making process of study participants.

Karvinen et al. (2007) sought to analyze the association between exercise intention and behavior in endometrial cancer survivors, using the TPB. The authors hypothesized that intentions among cancer survivors would be the most important factor for exercise behavior. However, additionally attitude, subjective norm, and perceived behavioral control would each be independent correlates of exercise intention. Exercise has been identified as a means to improve the quality of life for cancer survivors in physical, functional, and emotional ways.

The results of the study by Karvinen et al. (2007) showed that TPB accounted for variance in exercise behavior and exercise intentions. Attitude and self-efficacy were independent correlates of exercise behavior. Hence, the researchers suggest that exercise interventions for endometrial cancer survivors may be more effective if aimed at strengthening individuals’ exercise intentions and increasing their perceived control. Furthermore, healthcare practitioners should take into consideration whether a patient is obese or not, as this may impact their response and compliance to any exercise recommendation (Karvinen et al., 2007).

Martin et al. (2018) examined whether exercise intensity affects psychosocial responses of breast and prostate cancer survivors. Additionally, they explored whether exercise intensity would change the exercise motivation experienced by participants, as well as alter their experienced quality of life. The researchers noted that cancer survivors who are in remission or who are declared free of the disease often rate their quality of life as lower than it was prior to their cancer treatment. Although studies indicate that exercise can help improve the quality of life of cancer patients, statistics show that after overcoming cancer individuals decrease or stop exercising and most do not resume this activity after treatment with 70% of patients not meeting the recommended guidelines for physical activity (Martin et al., 2018).

Martin et al.'s (2018) findings showed that all groups who participated in the exercise program, regardless of the associated intensity (high or low), experienced an improvement in their perceived quality of life. However, compared with those who participated in the low-intensity group, high-intensity program participants were more likely to maintain their exercise motivation following the intervention. These findings suggest that it may be beneficial to introduce cancer survivors to higher intensities of exercise.

Wasley et al. (2018) examined how patients with advanced cancer and cachexia experience participation in exercise. Overall, cancer patients experienced a decline in daily activities, especially in advanced cancer stages. In part, this reduction is due to loss of muscle mass (cachexia) and a loss of appetite, associated with the disease and its treatment. Cachexia has a significant impact on a patient's quality of life. Evidence suggests that regular exercise can reduce cachexia and improve overall health, minimizing the risk of cancer reoccurrence. Based on previous findings, Wasley et al. used the TPB to explore participants' exercise behaviors, assuming that the motivation to exercise is linked to subjects' beliefs around the expected benefits or harm, potential for enjoyment, level of difficulty, and the support/approval of others.

Wasley et al. (2018) found that cancer patients lacked self confidence in their ability to participate in an exercise routine and had a strong belief that even exercise with a moderate intensity would be too difficult for them. Patients also felt that exercise could exacerbate their symptoms and that their condition would not really improve. It appears that cancer survivors would prefer to engage in physical activity at home or alone, which stands in contrast to current exercise intervention programs that are often held in group settings. Wasley et al. noted that their findings explain why cancer patients with cachexia have low motivation to engage in regular exercise. The perceived risk is greater than the perceived benefit, which is compounded by a lack of self-efficacy and low self-confidence. Therefore, empowerment, encouragement, and helpful advice from health care professionals could prove very important when it comes to promoting exercise and using exercise-based intervention for cancer patients.

Literature Review Related to Key Variables and/or Concepts

Mood and Emotional Factors

Degi (2016) focused on psycho-oncology and aimed to address mind and emotions in cancer in the widest sense. The article mentions that for most patients the cancer experience can have a considerable negative impact on their mental and emotional health, including their quality of life.

Irwin et al. (2013) reviewed the inter-relationship of cancer, depression, and sleep disturbance, particularly as research indicates that cancer diagnosis and treatment often result in an increase in inflammatory factors. It's hypothesized that this increase in inflammation is exacerbated by sleep disturbance, which then leads to a greater probability of depression. Irwin et al. (2013) state that major depression in cancer patients occurs at a rate that is three to five times greater than the general population. Research findings indicate that as the "population ages and the number of cancer survivors grows dramatically, depression will increase by 2030 to a position of the greatest contributor to illness burden" (Irwin et al., 2013, p. 559). Additionally, patients who suffer from depression are less likely to comply with recommended treatments including cancer-related therapies. Irwin et al. (2013) conclude that understanding the depression risk among cancer survivors can help to advance and improve cancer-related depression prevention and treatment.

Trudel-Fitzgerald et al. (2018) investigated whether anxiety and depression symptoms might lead to worsening lifestyle changes up to 20 years following a colorectal cancer diagnosis. This is of interest as it correlates to the current subject of psychological distress among cancer survivors, as anxiety and depression are associated with cancer diagnosis. Additionally, colorectal cancer is one of the most common forms of cancer (Trudel-Fitzgerald et al., 2018). The findings showed that anxious women were more likely to have unhealthier lifestyles (Trudel-Fitzgerald et al., 2018).

Almeida et al. (2019) addressed fear of cancer recurrence and noted patients' experiences. Their research aimed to create a more detailed and coherent understanding of patients' perspective in facing the possibility of cancer recurrence. Fear of cancer recurrence was defined as "high levels of preoccupation, worry, rumination, or intrusive thoughts; maladaptive coping; functional impairments; excessive distress; and difficulties making plans for the future. Having recurrent and long-lasting images or thoughts about cancer or dearth, and believing cancer will return" (Almeida et al., 2019, p.14).

The purpose of the study by Mellblom et al. (2017) was to explore whether negative emotions expressed by adolescent cancer survivors were correlated to persisting disease or treatment related health problems. Negative emotions included feeling fatigued or not having enough energy, and psychological distress in the forms of depression and anxiety. The findings of this study illustrated that emotional concerns of children who had cancer were frequently associated with potential late effects such as fatigue, pain, depression, and school-related challenges (Mellblom et al., 2017).

Brandes et al. (2017) identified the need for cancer patients to describe their concerns and a theoretical framework to help understand the complexity of these concerns as gaps in the literature. Their study used focus groups to discern their subjects' worries (Brandes et al., 2017) when it comes to facing cancer. Patients' emotional experiences were described as fear, loneliness, shame, frustration, denial, insecurity, and sadness. These emotions were based on the context of a fear of survival. Feelings of loneliness stemmed from their sense that most of their family and friends could not truly understand what it meant to have cancer. Feelings of shame were tied to having a stoma, catheter, or other medical adjustments, especially if they required help for self-care, frustrations due to new limitations and a lack of control over their lives, denial because of not feeling sick, insecurity about their physical appearance after hair loss, sadness related to the realization of major changes in patients' lives, as well as sadness about the impact the disease has had on the lives of the patients' loved ones (Brandes et al., 2017). The findings highlighted the importance of addressing cancer patients' emotional needs along with their instrumental concerns. Health care professionals have to be alert to listen for and recognize cues of emotional distress in cancer patients.

The study done by Bhattacharjee (2014) was aimed at ascertaining the emotional control of cancer patients. The researchers used 100 cancer patients selected from the Regional Cancer Center, Agartala and 100 non-cancer individuals to understand the difference in emotional control, as well as the impact of gender. The authors described emotional control as the "ability to direct the emotional expression of oneself or of another. It is a sign of emotional maturity and attainment of self-regulation" (p. 22). The study references empirical evidence of cancer patients having greater emotional distress, feelings of helplessness, and hopelessness than patients with coronary artery disease (CAD), highlighting that despite medical advancement, a cancer diagnosis often results in considerable suffering, pain, and not infrequently death (Bhattacharjee, 2014). All aspects of an individual's quality of life can be impacted by cancer. Interestingly, the type of cancer a patient faces isn't necessarily as significant a factor in determining their level of anxiety or psychological distress. Rather, being impacted in daily, life functioning, being younger or female, low education, or a lack of social support are considered greater risk factors for psychological distress. Cancer patients try to regain control over their lives by various means, and at times these could be risky behaviors such as smoking, or excessive drinking.

On the other hand, patients who use coping strategies such as relaxation, meditation, or exercise are less likely to show signs of depression, anxiety, or psychological distress (Bhattacharjee, 2014). Emotional control is an important aspect when it comes to effectively coping with cancer diagnosis and treatment. Cancer patients who have low emotional control show greater psychological distress than those who express and control their emotions (Bhattacharjee, 2014). Emotional control is lower for cancer patients than for healthy individuals, and emotional control is lower among cancer patients who have suffered from cancer for more than one year. The findings of the study suggest that psychological assistance for cancer patients is a necessary and effective coping strategy.

Hwang et al. (2016) conducted a study in order to determine the symptoms, emotional status, and quality of life experienced by ovarian cancer patients who were undergoing chemotherapy. They identified a cluster of symptoms among these patients that included psychological distress, fatigue-pain, abdominal discomfort, flu-like symptoms, fluid accumulation, and peripheral neuropathy. Furthermore, these issues were exacerbated by anxiety or depression. While depression was rated as part of the psychological distress cluster this aspect also included worry, feeling sad being sensitive, frequently being irritated, and dissatisfaction with one’s appearance. The findings of this study (Hwang et al., 2016) indicated that ovarian cancer patients experience multiple symptoms of psychological distress and that individuals with high levels of anxiety or depression were even more susceptible to these problems. Hence, it was recommended that interventions should have a therapy component that focuses on patients' emotional stability and on changes to their daily lives.

The purpose of the study by Cvetkovic and Nenadovic (2016) was to determine the degree of depression among breast cancer patients. Cytotoxic therapy is associated with psychological distress, which is often manifested in major depressive disorder. Breast cancer has the highest prevalence of malignancies among women. The findings of this study (Cvetkovic & Nenadovic, 2016) are mentioned as evidence to closely monitor patients' psychological well-being during the entire course of treatment, being alert to any indicators for psychological distress.

Cardoso et al. (2016) highlighted that 34 % of oncology patients are affected by mental health disorders, which are often not recognized as such and go untreated. They note that psychological distress can decrease the ability to cope with cancer treatment and diagnosis. Results showed a greater prevalence of depression and anxiety symptoms among the female cancer patients, showing a gender associated risk factor for anxiety and/or depression. A history of prior neurosis was correlated with a threefold increase in the probability of having anxiety (Cardoso et al., 2016). The authors concluded that health care professionals, supportive family members, and caregivers should be aware of the risk factors involved when patients start chemotherapy. Early treatment and support to assist patients in coping with anxiety and depression could reduce psychological distress.

The purpose of the study by Vallerand et al. (2017) was to examine the correlations between independent and combined exercise guidelines among hematologic cancer survivors (HCS). In order to improve the quality of life for cancer survivors, as well as their physical functioning, the American College of Sports Medicine (ACSM) recommends weekly exercise (Vallerand et al., 2017). The combined exercise program consisted of aerobic and strength exercise participation. The authors explored the follow through of participants on their intention to follow a combined exercise program. The results showed that only 40% of HCS, who stated that they would commit to the program, actually did so. Furthermore, the findings give evidence of the positive impact of intention on behavior. Not having any children living at home was also positively correlated with engaging in the combined exercise program. Health promotion efforts should take into consideration a design that incorporates both strength and aerobic exercise for cancer survivors.

Motivational Factors

Robinson et al. (2016) focused on examining motivational factors influencing breast cancer survivors' participation in competitive fitness and maintaining an exercise regimen thereafter. Their study highlights how exercise affects quality of life and could be linked to a possible reduced recurrence for breast cancer survivors. Furthermore, it mentions that physical and psychological factors present barriers for initiating and maintaining a regular exercise routine (Robinson et al., 2016), highlighting the important role of psychological factors in cancer patients continuing to engage in exercise during and following treatment. These findings show that individual cancer survivors are more motivated to maintain regular exercise in a group setting.

Bennett et al. (2007) designed their study to test if motivational interviewing would help long-term cancer survivors increase their participation in self-selected regular physical activities. Empirical evidence shows that physical activity improves daily functioning, quality of life, and decreases fatigue. Researchers assigned participants to motivational interviews via intervention groups and each participant received tailored counseling to increase motivation to begin a regular exercise routine. The motivational interviews were client-centered, using such strategies as careful listening, summarizing, feedback, affirmation, and building the interviewee's self-efficacy, or confidence. The overall goal of this motivation was to encourage all participants to embrace a routine of 30 minutes of moderate intensity planned physical activity on most weekdays (Bennett et al., 2007). The results showed that the individuals who received motivational interviewing increased their self-reported regular physical activities. However, it is also mentioned that motivation to adopt a regular exercise routine among cancer survivors is difficult and could require motivational interviews that are more direct in their approach to stimulate self-efficacy in patients.

Peddle-McIntyre et al. (2013) examined variations in motivational results associated with exercise following a supervised progressive resistance exercise training (PRET). Peddle-McIntyre et al. (2013) note that research demonstrates that supervised exercise training interventions in patients with lung cancer can increase aerobic fitness, physical functioning, and decrease overall fatigue. Yet, the attained benefits of such interventions can only be maintained with sustained exercise behavior. Motivation to maintain such postintervention exercise behavior is the focus of this study. Researchers used the TPB to better understand changes in motivational outcomes. Improvements in self-efficacy, perceived behavioral control, and affective attitude were identified as significant correlates of intention. Postintervention, 87% of participants who completed the supervised training were motivated to request an exercise prescription.

Additionally, 73% of participants had the motivation to sign up for a supervised session of exercise training for either home- or gym-based programs. Based on the findings of this study there is an indication that lung cancer survivors who complete a supervised PRET intervention have a motivation to maintain a regular exercise routine thereafter (Peddle-McIntyre et al., 2013). Practical application of these findings could lead to health care professionals offering a home-based session or providing guidance on how to continue an exercise program in a community setting.

Voege et al. (2015) analyzed motivations and barriers as determinants of physical activity in women diagnosed with breast cancer. The researchers defined approach motivations as engaging in physical activity because it feels good, to have a healthy body, because I find exercise invigorating, because I want to maintain good health, for the enjoyment of the experience of exercising, because I find exercising satisfying in and of itself. They hypothesized that these would be associated with higher levels of activity. Among the younger breast cancer survivors in the study, approach motivations were correlated with an increase in physical activity and barriers were associated with a decrease in physical activity. These findings highlight how important approach motivations are in association with helping breast cancer survivors to maintain regular physical activity. Additionally, maintaining physical activity is linked to affecting the risk for breast cancer recurrence and death (Voege et al., 2015).

Burke et al. (2015) aimed to understand the lived experience of patients with advanced rectal cancer while they tried to follow a prescribed, hospital based pre-surgical exercise program. The study focused on exploring patients’ interest and motivations when it comes to exercising prior to surgery. Understanding why some patients choose to remain involved in physical activity could help support the promotion of exercise during a time when it is most important for cancer patients, improving their health, well-being, and quality of life (Burke et al., 2015). Many patients experience emotional distress in the form of fear, anxiety, and depression while processing the risks involved prior to surgery. Interventions to reduce adverse emotional experiences in cancer patients would prove beneficial. The findings of this study (Burke et al., 2015) identified the following motivational factors: building camaraderie, peer support, experiencing a sense of structure and control, feeling safe, and encouraged. Additionally, being active in the program led to motivation to exercise outside of the program, and even continuing to do so in the future. Burke et al. (2015) concluded that their findings demonstrate that patients can become more motivated and positively affected by a supervised exercise program in a hospital setting. Patients need to be made to feel safe and encouraged in these arrangements.

Midtgaard et al. (2009) examined self-reported physical activity, exercise motivation, and the experience of cancer patients who are receiving chemotherapy. The well-being and quality of life of cancer patients are significantly affected by physical activity. Yet, chemotherapy often disrupts the routine of regular physical activity. Cancer survivors are at risk for cancer recurrence, cardiovascular disease, obesity, and chronic fatigue. These diseases are associated with a sedentary lifestyle. Physical activity is an essential health promoting strategy that benefits cancer patients.

Nevertheless, chemotherapy during cancer treatment has several side-effects which include fatigue, nausea, vomiting, diarrhea, constipation, hair loss, muscle weakness, and alterations to a patient's senses, all of which could disrupt a regular exercise routine of an individual impacted by cancer. Mitdgaard et al. (2009) followed a pattern set by the TPB to assess patients' motivation, looking at five expressions of a person's desire towards and belief in ability to exercise. These statements were: exercise attracts them, exercise is beneficial/exercise is harmful to cancer patients receiving chemotherapy, belief in ability to exercise/be physically active while undergoing chemotherapy, and the will to exercise on days when they don't feel well. The findings of this study reiterate the negative impact of chemotherapy on motivation and physical activity. The level of physical activity that patients had prior to cancer diagnosis somewhat predicted the level of physical activity maintained during cancer treatment, linking cancer patient's exercise compliance and motivation to earlier experiences with physical activity. Patients noted their disease and treatment as reasons for engaging in less physical activity, highlighting these factors as barriers.

Larsson et al. (2008) explored how women who have been treated for breast cancer experience physical activity after surgery. Larsson et al. (2008) used an interview guide with semistructured questions to interview 12 women within a three-week period.

The approach in this study was a qualitative phenomenographic approach to assess compliance, need for assistance, difficulties to regain a normal lifestyle, fear of negative side-effects, a desire to avoid new limitations, and the ability to strategically control the situation.

The findings indicated that a desire to regain the previous health and a “normal” physical condition was a great motivator for physical activity after breast cancer surgery. Women spoke about their experience of trying to be motivated for physical activity, compliance with instructions, a struggle to regain normal health and avoid cancer recurrence, a desire to avoid limitations, and having control of the situation. The authors suggested that these motivating factors should be taken into consideration by health care professionals and that health care providers could focus on a goal of empowerment for these cancer survivors to regain control of their lives (Larsson et al., 2008).

Courneya et al. (2004) explored exercise motivation level and adherence to an exercise routine in cancer survivors. The researchers anticipated that cancer survivors who had higher expectations of success, more positive affect, and less negative affect would be more motivated to stay physically active and have greater rates of post-program exercise. This description defined motivation among cancer survivors. A total of 60 participants were assigned to a physical fitness test and filled out questionnaires. Five weeks later a self-administered questionnaire, which contained an exercise measure was mailed to all subjects. The intervention was based on individual fitness assessments and required participants to follow a home-based personalized exercise routine.

The findings of this study (Courneya et al., 2004) were in line with the expectations and allowed the authors to reject the null hypothesis. Expected success and affective reactions predicted post-program exercise adherence. Courneya et al. (2004) concluded that the findings support a focus on promoting high expectations of success and positive affective reactions in cancer survivors in order to facilitate exercise adherence. Additionally, the results identified an interaction between perceptions of success and personal control in achieving expected improvements and avoiding negative emotions. In application, these findings also support using positive feedback to enhance perceived success when recommending exercise to cancer patients.

Courneya et al. (2016) focused on the lack of motivation among breast cancer patients to perform different types and doses of exercises. The purpose of their study was to analyze how breast cancer patients would anticipate and experience motivation before and after three different workout routines while receiving chemotherapy. Specifically, the goal was to ascertain which exercise programs would stimulate the greatest motivation, which exercise intervention met or exceeded initial motivational expectations, and which clinical, demographic, and behavioral variables had the greatest impact in modifying motivational outcomes. The benefits of exercise highlighted by the authors were health-related fitness and quality of life outcomes, chemotherapy completion rate, and greater chances of survival without cancer recurrence.

The researchers hypothesized that motivation would be higher in women who were younger, healthier weight, aerobically fitter, and who had a previous exercise routine. Motivation was greater for exercise programs that contained both aerobic and resistance training, as opposed to standard aerobic exercise. It seems plausible that the patients viewed the combined exercise program as more enjoyable and therefore had greater motivation to participate in it. On the other hand, the high-volume program could have been discouraging, making them feel overwhelmed about too much aerobic exercise during chemotherapy. The authors' hypothesis proved true and women who were already exercising were more motivated to participate in the exercise intervention, than were non-exercisers and lower fit patients (Courneya et al., 2016). Clinicians can use cancer patients prior exercise self-efficacy as an indicator of future motivation to comply with recommended exercise programs.

Summary and Conclusions

Cancer diagnosis, treatment (e.g., chemotherapy, radiation, surgery), and survival-related issues (e.g., fear of cancer recurrence, facing new limitations, mood, and personality changes) are significant and often quite challenging psychologically (Gundelach & Henry, 2016; Kuba et al., 2019; Hardee et al., 2017). The primary goal for health professionals as well as patients is to eliminate the cancer and prevent cancer recurrence. Nevertheless, along with a focus on addressing the cancer itself, research findings show that exercise can contribute to physiological and psychological improvements (Gutman & Nemeroff, 2011). Despite the psychological distress of cancer there have been those who have been able to maintain a regular routine of exercise. This chapter noted some of the determinants that are linked to exercise. For example, having positive perceptions of exercise, as well as self-efficacy are linked to physical activity despite facing cancer (Gorczynski & Vancampfort, 2018).

Additionally, individuals who have already had a regular exercise routine before their cancer diagnosis, or those who stick to a prescribed exercise intervention for a longer period of time are more likely to continue to maintain a regular exercise program thereafter (Husebo et al., 2013). For those who have not experienced the effects of having a routine of regular physical activity and exercise it may be beneficial to highlight the association between cancer and exercise, including prevention, coping, and lower risk of recurrence (Graham et al., 2006), in order to increase the probability of compliance with exercise recommendation or intervention.

Furthermore, it appears that besides the physiological, and psychological benefits of exercise, there is a positive impact on the quality of life of cancer patients and survivors, including individuals whose treatment has not resulted in cancer elimination (Capstick & Tonkin, 2007). An improvement in quality of life that is linked to exercise is stress reduction, which is in turn linked to a decrease in symptoms of depression (Edenfield & Blumenthal, 2011). This chapter also highlighted some of the barriers to exercise, which are important to consider as they are often a significant obstacle for those impacted by cancer.

A major obstacle to exercise is the presence of negative emotions. These can include negative thoughts about exercise itself and the belief that its benefits are not worth the risk, or negative emotions about one’s own ability, likelihood of success, or a lack of self-confidence (Gorczynski & Vancampfort, 2018; Wasley et al., 2018; Karvinen et al., 2007). Cancer diagnosis is a significant stressor, which is associated with anxiety (Trudel-Fitzgerald et al., 2018) and depression (Gutman & Nemeroff, 2011). Stress as well as depression cause biological changes that affect pathophysiology (Baum et al., 2011). Depression is a major obstacle to physical activity and can impact an already compromised immune system of cancer patients, making it more difficult for them to follow any exercise routine.

The foregoing research findings make it clear that exercise is beneficial for cancer patients and survivors. Cancer diagnosis is a traumatic event that is associated with anxiety, depression, and fear. Cancer treatment results in stress and often a reduction in quality of life. Yet, there are cancer patients and survivors who despite their psychological distress and the various obstacles and personal challenges they face, they've been able to maintain a regular exercise routine. While research findings have highlighted the benefits of exercise regimens, there is a need to explore the experiences of cancer patients who are able to maintain a regular exercise during treatment despite psychological distress. In Chapter 3, I will discuss the methodology that was used to better understand these experiences, as well as the study design.

Chapter 3: Research Method

Introduction

The purpose of this qualitative study was to understand how cancer survivors experience psychological distress due to cancer diagnosis, treatment, survival, or fear of recurrence and how such factors play a role in some patients' continuing to maintain an exercise routine. In this chapter, I describe the research design, the methodology used, data sources, data collection, the research question, setting, sample, threats to validity, ethical considerations, and role of the researcher. The RQ was, What is the role of psychological factors in cancer patients' continuing to engage in exercise after cancer diagnosis?

Research Design and Rationale

I based the research design on the goal of answering the research question, which was, What is the role of psychological factors in cancer patients' continuing to engage in exercise after cancer diagnosis? To explore the study topic, I used a qualitative approach. As the researcher, I played a key role as the instrument of data collection by conducting semistructured in-depth interviews (see Creswell, 2009), using open-ended questions to maximize response depth and length (Ivey et al., 2014). Qualitative researchers examine topics through the eyes of those who have experienced them in a natural setting and emphasize their perspective as a point of reference (Creswell, 2009). As such, use of a qualitative approach was therefore deemed appropriate given the chosen research topic.

The research design was a qualitative study focusing on understanding the experience of psychological distress during or following cancer diagnosis, treatment, and fear of recurrence. To answer what the role of psychological factors in cancer patients' continuing to engage in exercise during and following treatment, I conducted face-to-face interviews with participants. This allowed participating cancer survivors to provide in-depth, detailed input about their experience (see Creswell, 2009).

Role of the Researcher

My role as a researcher was to observe, listen, and record each interview with the recruited participants of this study. My relationship with the volunteers was professional only. My connection to all participants was exclusively based on this study. I did not have any supervisory role or any other authority over the participants outside of the study that could have led to bias based on power over the subjects. A possible bias that could have influenced me is the belief that exercise is beneficial and leads to an improved state of mental and physical health. To neutralize any bias in this regard, I avoided or minimized social conversations and adhered to the outlined interview questions along with common courtesies.

I approached each interview as neutral as possible not relating my own ideas to participants or sharing any other information with them that could possibly have influenced their responses. During the current COVID-19 pandemic, each interview was conducted over the videoconferencing platform Zoom. Hence, participants were at home or in an environment of their own choosing, that was comfortable for them. This should have minimized any factors of environmental biases that might have occurred otherwise. I was accountable for following the outlined research process. I designed the open-ended interview questions (see Appendix A) and conducted the semistructured, in-depth interviews with participating cancer survivors. Also, I collected and analyzed the data, which involved recording, transcribing, and developing the emerging themes. I ensured execution of an informed consent form, transcripts, and all related documents. There were no other concerns over bias associated to work environment, conflict of interest, or power differentials that would have applied in this study.

Methodology

Participant Selection Logic

The population for this study were cancer survivors who were at least 18 years old. To be considered a cancer survivor, a person must have been diagnosed with cancer; a lack thereof would have been an exclusion criterion. It was not necessary for a participant to have started cancer treatment. Race, ethnicity, or sex were not determining factors in being included in the sample for this study. Selection criteria were based on being a cancer survivor, being 18 years or over, and maintaining physical activity as defined herein as exercise for at least 2 months prior to the patient's cancer diagnosis and doing so no less than once per week for a minimum of 30 minutes. To be included in the study, the exercise routine had to be maintained up to or beyond cancer diagnosis and could not be discontinued for more than 1 month before cancer diagnosis. Furthermore, inclusion was based on the ability to speak and understand English, a willingness to participate in a semistructured, in-depth interview about their lived experience, and completion of an informed consent to be interviewed and recorded. Not meeting any of these criteria was considered an exclusion criterion.

Sampling and Sampling Procedures

I recruited participants using the social media network, Facebook (see Appendix B for the recruitment post). The recruitment was specific to cancer support communities or groups within the social network, including Cancer Care, American Cancer Society, Stand Up to Cancer, Cancer Caregiver Support, and Breastcancer.org. Any individuals who wanted to participate could have done so voluntarily as long as they had been diagnosed with cancer, had had a regular exercise routine for at least 2 months that was no less than once per week for a minimum of 30 minutes that was not discontinued for more than a month prior to diagnosis, and were at least 18 years old. All individuals who responded to the Facebook recruitment and who met the inclusion criteria were contacted for an interview until saturation was met. Saturation was determined after no new themes emerged from the in-depth interviews. Saturation in this qualitative research design was determined by interviews consistently bringing forth responses that were similar or the same as previous answers. Saturation was reached when all categories of interest were well developed and addressed. Once the in-depth interviews allowed me to define, check, and explain the association between what participants had said and the emerging themes and no new properties of interest emerged for analysis, I determined that saturation had been reached (see Nelson, 2017). For the purpose of this study, the anticipated number of volunteers needed for saturation was around 8 to 10.

Instrumentation

I conducted semistructured interviews, utilizing open-ended questions (see Appendix A), to allow participants to express themselves freely. Open-ended questions usually require more elaborate answers and facilitate a deeper exploration of the phenomenon under consideration (Ivey et al., 2014). A demographic survey was also included in the interviews (see Appendix C).

Furthermore, research findings show that one of the most effective ways of gaining insight into people's experiences, understanding the perceptions of their lives, is through the frequently used technique of in-depth, semistructured interviews (Mahat-Shamir et al., 2019). Therefore, I am confident that this instrument effectively answered the research question, What is the role of psychological factors in cancer patients' continuing to engage in exercise after cancer diagnosis? By using this method, I was able to prompt interviewees to retrieve information as well as provide a comfortable setting in which conversation could unfold and the subjects could freely express themselves. This stimulated data of much greater depth in meaning and within the context of participants' experiences, allowing the interviewer to better grasp the association between accounts and their meanings (Mahat-Shamir et al., 2019). This was the basis for my interview development to gain understanding of the experiences of cancer survivors and the related psychological factors. To establish content validity, each interview was recorded via Zoom videoconferencing. This allowed me to review each interview multiple times in order to transcribe each interview. Each participant was allowed to review the transcript of his own interview for verification, adding to content validity. I compared finished transcripts to the interview recordings for analysis, and further verification. Thereafter, I focused on coding and searching for emerging themes.

Procedures for Recruitment, Participation, and Data Collection

I recruited each participant through the social network Facebook as the current COVID-19 pandemic and the associated restrictions had reduced or eliminated the possibility of in person recruitment opportunities. Any cancer survivor who was at least 18 years old and who had been diagnosed with cancer could voluntarily respond to the Facebook invitation. All those who were accepted into the study answered a number of questions (see Appendix A) in an in-depth interview that was conducted using the videoconferencing platform Zoom. The interviews took less than 1 hour. They were recorded. Data collection involved transcribing, analyzing, verifying, and reporting information (see Mahat-Shamir et al., 2019). I reviewed the interview recordings and transcribing them, coding, and searching for emerging themes. Interviewees had the option to review their own transcripts to ensure accuracy and improve content validity.

Data Analysis Plan

I recorded and subsequently transcribed each interview. The information collected from these interviews was used to gain understanding of subjects' experiences in dealing with the psychological distress of cancer diagnosis, treatment, and fear of recurrence while maintaining a regular exercise routine. The focus of these interviews was the experiences of the participants. I strove to set aside my own experience (see Creswell, 2009).

In order to identify, analyze, and report patterns gleaned from the data corpus, I followed the method of thematic analysis outlined by Braun and Clarke (2006). This allowed for flexibility while providing clear and concise data. I identified relevant themes through a process of systematic coding of interview transcripts. When a section of text was deemed relevant to the research question, it was assigned a code (see Braun & Clarke, 2006). Codes were then combined into higher order conceptual categories (i.e., themes). The themes were identified via an inductive approach, allowing the data to speak for itself and drawing conclusions from its details. The thematic analysis also included underlying ideas, assumptions, and concepts at the latent level (Braun & Clarke, 2006).

I followed the six steps of Braun and Clarke (2006). The process involved getting familiar with my data through repeated reviewing and transcribing, noting points of interests for all of the data and creating codes for these, then using relevant codes for generating themes, examining the themes for context (thematic map) and pertinence, defining and naming each theme, and lastly, producing a report for all of the data I analyzed. The goal of this coding process was to assign meaning to the information collected, understanding what the data says and labeling it accordingly (Saldana, 2016). The aim was to systematically arrange the data into categories, themes, and meaning. The meaning was based on my reflection on the main point that were highlighted, and the personal feelings interviewees expressed in relation to their answer (see Ravitch & Carl, 2016).

Issues of Trustworthiness

Trustworthiness of this study was highly important. While validity is often associated with a quantitative research design there is no doubt that being faithful to the experiences of all participants is significant. Accuracy, quality, and rigor of this study cannot be overemphasized (Ravitch & Carl, 2016). In order to protect against possible threats to validity the approach of transactional validity was utilized to ensure greater accuracy by protecting the collected data, keeping it in a secure place, revisiting recordings and transcriptions multiple times to eliminate possible errors.

The standards to reduce threats to qualitative research validity are credibility, transferability, dependability, and confirmability (Ravitch & Carl, 2016). Credibility, similar to internal validity, was ensured by following the qualitative research design, properly executing the role of the researcher in collecting data and protecting the data from inaccuracy or manipulation. Transferability, similar to external validity, depended on faithfulness to the cancer survivors' experiences, that is not altering any of their input but having detailed descriptions thereof. Thick descriptions, that is descriptions that highlight cancer survivors' experiences in detail as well as the context allowed for comparisons to other situations with the detailed content as a foundation (Ravitch & Carl, 2016).

Dependability, or reliability, is focused on the consistency or stability of the study. This was secured by collecting the data as described and by participants responding to the interview questions. Saturation played an important role in the content validity of this study. Ensuring that there had been enough data collected was important not just to answer the research question satisfactorily, assess completeness and comprehension, but also allowed for replication (Elo et al., 2014). Interviews were recorded via Zoom, reviewed and transcribed. The research plan was followed exactly, and each step will be articulated and outlined (Ravitch & Carl, 2016). Confirmability, or objectivity, were taken into consideration my role as researcher and any possible biases I might have had, minimizing this by having confirmable data, relative neutrality, and acknowledging anything that I might have contributed that could have affected data interpretation (Ravitch & Carl, 2016). Each participant had the option to review the transcript of their own interview to confirm accuracy and contribute to content validity.

Ethical Procedures

The Walden Institutional Review Board (IRB) ensured that all research proceedings in this study complied with Walden University's ethical standards along with U.S. federal regulations. No data collection took place until IRB approval had been granted. All individuals who were interested in participation in this study signed up voluntarily and without any coercion or monetary incentive, as they responded to the Facebook recruitment invitation. All study participants were asked to read and reply via email to an informed consent form prior to being interviewed. There was a full disclosure of the interview content so volunteers could be certain that the topic of discussion didn't make them uncomfortable or bring up anything that could've resulted in psychological distress in itself. Subjects were free to withdraw from the study at any time. The interviews were conducted and recorded using the videoconferencing tool called Zoom. Each interview was conducted in a password protected virtual setting and recorded directly on to a single desktop that was accessed by only the interviewer and was password protected. All interviews were confidential, subjects' names were not mentioned in the study, recordings, and transcripts were kept on a single desktop that was password protected and used by only the researcher. Names of volunteers were separated from the collected data, and codes for identification were used. The data will be kept no longer than five years and thereafter be discarded. Interviews, recordings, and transcripts were assigned arbitrary but consecutive descriptions to further protect the identity of cancer survivors in this study.

A significant concern in qualitative research is the role of the researcher as the primary instrument of data collection and analysis. Subjectivity, identity, positionality, and meaning making are all processes associated with the researcher and could mold data and findings. Hence, in order to follow ethical guidelines, it was important to explore my own possible biases. I addressed this throughout the study through critical self-reflection (Ravitch & Carl, 2016).

Summary

This chapter addressed the qualitative approach implored to execute the research. It described how the single focus or phenomenon of interest will be explored (see Creswell, 2009). The participants are individuals who are 18 years or older and have experienced a cancer diagnosis, and treatment while maintaining physical activity regularly. The chapter provides detailed information on how participants were interviewed, data collected, analyzed, and ethical principles respected and followed.

Chapter 4: Results

Introduction

The purpose of this qualitative study was to examine the psychosocial factors that may underlie cancer patients continuing or failing to continue to exercise after cancer diagnosis. I explored participating patients' attitudes toward exercise despite the traumatic experience of cancer diagnosis, treatment, and fear of recurrence. Psychological distress can manifest itself as signs of sadness, anxiety, distraction, and symptoms of mental illness. Depression, feelings of loneliness, and even posttraumatic stress disorder can become part of the daily experiences of cancer patients and survivors (Greenblatt & Saini, 2019). Cancer diagnosis can contribute to a plethora of psychological factors that negatively alter an individual's thoughts and emotions, often impacting their quality of life, as well as daily functioning in such areas as finances, family, sexuality, spirituality, and more (Gundelach & Henry, 2016).

However, despite these stressors there are those cancer survivors who can maintain an exercise routine. There is limited knowledge on their experiences how they describe the impact of cancer diagnosis and maintaining an exercise routine, according to my review of the literature. To address this gap in the literature, I sought to answer the following RQ: What is the role of psychological factors in cancer patients' continuing to engage in exercise after cancer diagnosis?

In this chapter, I will discuss the results of this study, highlighting the setting of the in-depth interviews, relevant demographics and characteristics of participants, and data collection and analysis procedures. I also provide evidence of trustworthiness and specific results, as well as a summary. The data collection section includes the number of participants, location, frequency, and duration of interviews. I describe the data collection instrument and how data were recorded. The data analysis section includes information on the process used to move from codes to category and theme development. Codes, categories, and themes are described and explained.

Setting

The setting for this study was impacted by the COVID-19 pandemic. Recruitment had to be done through social media, and face-to-face interviews were not possible. In accordance with Walden University's guidelines for research during the pandemic, I followed the protocol outlined on Form C: Ethics Self-Check Application for IRB Approval. A social media post on Facebook was used for recruiting volunteers, who then could email me if they were interested in participating in the study. I emailed a consent form to each recruit, who then could simply reply "I consent" via email. Furthermore, participants who agreed to proceed with the study were contacted via phone call to answer any additional questions and to set up an in-depth interview via Zoom videoconferencing. The correspondence between researcher and participants was private. No monetary compensation was offered, and it was emphasized that each participant was proceeding voluntarily and was free to withdraw at any time.

Demographics

All participants (see Appendix E) were over the age of 18 years, were presently living in the United States, and had been diagnosed with cancer. I gave each participant a number to protect their identity and confidentiality. There were a total of 10 participants in this study. In this section, will present the demographic characteristics of the sample.

Participant 1 was a 70-year-old married woman who was diagnosed with Stage 4 metastatic breast carcinoma. The cancer was invasive mammary carcinoma with lobular features. The diagnosis was on June 21st, 2018. She was very physically active before her cancer diagnosis, doing lots of walking, stair climbing, and outdoors activities like hiking. The diagnosis came as a shock and was devastating to her. She struggled with feelings of depression, fatigue, nausea, pains, anxiety, and mental tiredness. Yet, despite these feelings she was determined to stay active and to maintain a positive viewpoint. Although she noted a significant change in stamina, energy, and motivation, she stayed as physically active as possible and felt better anytime she exercised.

Participant 2 was a 33-year-old married man who was diagnosed with appendiceal cancer at the age of 11 years and with basal cell carcinoma at the age of 23 years, as well as at the age of 31 years. He has been keeping a consistent routine of weightlifting, running, and calisthenics. However, his cancer diagnosis had caused him to feel overwhelmed with anxiety and worry at times. He reported battling with a fear of cancer recurrence, anxiety, depression, and hypervigilance. The psychological factors involved have added a significant amount of stress to his daily life as well as marriage. Nevertheless, he stated that working out provides him with stress relief, improvement in mood, more energy, and greater fitness. He stated that during his workouts he does not feel stressed or anxious.

Participant 3 was a 50-year-old single woman who was diagnosed with Stage 3 invasive lobular carcinoma. She felt extremely scared of the possible outcomes of her cancer diagnosis. Prior to being diagnosed with cancer she had a daily workout schedule in which she particularly enjoyed the outdoors. She felt overwhelmed with emotions after her diagnosis and could not control her crying, and anxiety. She felt a morbid threat of death. After starting her chemotherapy, fatigue, hot flashes, and weight gain limited her former workout habits. However, she pushed herself to maintain physical activity although at a lower frequency and lower intensity than before her cancer diagnosis.

Participant 4 was a 75-year-old widowed woman who was diagnosed on November 12th, 2019, with triple negative, metastatic breast cancer. She described herself as someone who has always been very active, especially before her cancer diagnosis. The diagnosis was extremely distressing to her, although she had an intuitive feeling that something was not right with her overall health at the time. She stated that the diagnosis hit her like a ton of bricks. It was devastating to her, yet her exercising and her faith helped her through it. Swimming, walking, and running was her weekly routine for at least an hour, 3 to 5 days per week. She said that her motto is to "keep moving," especially now with chemotherapy as "you have all these chemicals inside of you." She stated that she had always been a naturalist who does not like chemicals. Surgery, chemotherapy, and stress had made her more tired than before her diagnosis. She said that she often feels tired of dealing with cancer, but she would force herself to exercise,

Participant 5 was a 71-year-old married man who was diagnosed with non-Hodgkin's lymphoma in February 2004. He spent a lot of time outdoors, being physically very active and doing so with his wife. The diagnosis was very surprising to him, and a sense of uncertainty became part of his daily life. A fear of death made things difficult mentally and emotionally. He has been battling with cancer for over 17 years. His physical activity and exercise routine became very difficult to maintain due to chemotherapy that at times lasted 8 hours per day, accompanied by feelings of anger, fear, sadness, frustration, and tiredness. Yet, his advice and determination are to stay on top of things, keep a positive attitude, and stay as active as you possibly can under the circumstances.

Participant 6 was a 50-year-old married man who was diagnosed with an odontoma in his mandible. He was diagnosed during a routine dental appointment and told that he had a growth in his mandible that had to removed. Additionally, a biopsy needed to be done to determine if the growth was benign or malignant. The participant was highly active before the diagnosis, with a weekly routine of lifting weights, doing cardiovascular exercises, and engaging in calisthenics. Nevertheless, the unexpected diagnosis caused him to be very worried and anxious. The associated surgery required a liquid diet and movement restrictions that were very stressful, causing a weight loss of approximately 30lbs. The patient was not allowed to do any strenuous activity for nearly 10 months. However, he substituted his previous workout routine with walking until he could resume weightlifting and calisthenics although at a much less intense level. He strongly felt that exercise helped him mentally and physically. He said that being active improved his personality and thoughts.

Participant 7 was a 56-year-old married woman who has had multiple diagnoses of basal cell carcinoma. The first time she was diagnosed with cancer was in 2006. She is very active physically. Her weekly exercise routine consists of 4 to 5 days of cycling, hiking, and walking for an hour. Yet, after her skin cancer diagnosis she started to worry about how her life was going to change and if it was going to get worse, progressing to melanoma. She felt fear, uncertainty, and self-consciousness. The treatments of surgery, topical chemotherapy, and photodynamic therapy caused her pain and left her anxious about what her appearance would be and wondering if she would have scars on her neck and face. The cancer and treatment were associated with restrictions that caused frustrations. She said that the sun has become her enemy, and enjoyable activities like spending time on the beach in the tropics have become an impossibility. Nevertheless, she has learned to maintain her workout schedule around her health restrictions. She does her exercises early in the mornings. Despite the restrictions, the pain, and tiredness that cancer and its treatment have brought, she loves exercising being outside walking. Her outdoors exercising has a very calming effect on her; she feels that she is taking care of her body and mind.

Participant 8 was a 53-year-old married woman. She was diagnosed on March 2nd, 2020, with primary lung adenocarcinoma, left primary bronchus, and brain metastases of two tumors in the right hemisphere. The patient was moderately active with 5 to 6 days of walking each week prior to the cancer diagnosis. However, afterwards she reported suffering from severe headaches, weight gain, swelling, and fatigue. She has been treated with surgery, radiation, and chemotherapy. She stated that the chemotherapy had the most significant and deleterious impact on her well-being. She stated that her exercise and physical activity has probably been reduced to about a quarter of what they used to be before her cancer diagnosis. Psychologically, she has been dealing with feelings of anger, frustration, and worry for her family. She stated the following: “I am angry because lung cancer is supposed to be a smoker’s disease, and I never smoked a day in my life, not a single cigarette!” She has been coping with cancer by taking things a day at a time, and she has come to understand that it is not an automatic death sentence. She tries to be as active as possible because she feels that inactivity just makes everything worse.

Participant 9 is a married 50-year-old man who was diagnosed with melanoma in 2012. At the time of diagnosis, he was living in Tanzania, Africa. He was physically very fit and active. His exercise regimen consisted of walking 3 miles every day 6 days per week. When he was diagnosed with melanoma, he did not understand the significance or severity of his cancer. Hence, it did not impact him very much psychologically. He felt that it was an inconvenience to his routine. He understood that he needed surgery, but it was not until the progression of his cancer required more and more medical attention, forcing him to move back to the United States for treatment, that he began to grasp the seriousness of his diagnosis. The treatment procedures left him in much pain and reduced his level of physical activity. He described the photodynamic therapy as the most excruciating thing he has ever been through, including his 12 surgeries. Therapy has often interfered with his exercise routine, but he has always tried to stay active. He stated that he feels better the more active he stays. He tries to force himself to be active.

Participant 10 is 58-year-old married woman who was diagnosed with a desmoid tumor that attached to the right kidney, liver, and bladder. The patient was extremely physically active, an athlete, running 10 miles per day on a treadmill, 7 days per week. Additionally, she does calisthenics and stretching. The diagnosis occurred in 2005 after she experienced excruciating pain and was taken to the emergency room in the middle of the night. The diagnosis caused an immense fear of death. She nearly fainted. However, she was determined to fight, stating that "cancer is a monster inside of you." After a few months of recovery from surgery, she slowly began to exercise again. First, she started with a walking pace, then she moved to a fast walk, but as she felt her body getting stronger again, she went back to running. Her experience has brought her from feelings of despair to feelings of appreciation and empathy for others with cancer. She says: "Life is a gift!" She says that exercise has a positive impact on her emotions; it does her body well, and without exercise she is not happy.

Data Collection

I collected the qualitative data for this study via semistructured in-depth interviews (see Creswell, 2009), utilizing open-ended questions to maximize response richness (see Ivey et al., 2014). There were 10 participants included in this study. Each participant was a cancer survivor who was diagnosed with cancer prior to this study and who had been engaged in physical exercise. The interviews were conducted via Zoom videoconferencing and lasted about 30 minutes each. I used a voice recorder to document each interview. All participants were contacted via phone to set up the interview prior to the Zoom meeting. The interview recordings were thereafter transcribed by me for coding and thematic analysis.

Data Analysis

I followed a six-step process for data analysis outlined by Braun and Clarke:

1. Reviewing and transcribing all data collected.
2. Noting all points of interests relevant to the study and creating codes for these.
3. Retaining relevant codes as basis for generating themes.
4. Examining the themes for context and pertinence (thematic map)
5. Defining and naming each theme.
6. Producing a report for all data analyzed.

Each audio recording was transcribed into a Word document. Each transcript was reviewed multiple times to clearly identify text passages relevant to the research question and to move forward to inductive coding. The individual points were then coded with concise expressions that attempted to capture the essence of participant' statements. After the coding of all interviews was completed, the codes were further analyzed to identify higher order conceptual categories (i.e., themes). The theme development was based on an inductive approaching, permitting the data to speak for itself and drawing conclusions from its details.

A total of 266 codes were drawn from the 10 interviews. Codes were then examined for similarities and eventually collapsed into 10 themes. For example, interview codes such as: "I feel better active," "I feel better exercising," Exercising keeps me balanced," "I have more energy when I exercise," and "Running makes me feel good," were all given the same code# 2 and later synthesized into theme# 2: Benefits of exercising. This inductive process was iterative and allowed for interpretation of the raw data, leading to the development of concepts that aid overall understanding and are the foundation of the themes that to followed.

All themes appeared relevant; however, some were homogenous and expressed analogous categories. Themes such as "Exercise volume and/or frequency," and "Exercise habits before cancer," could be collapsed into the theme "Attitudes towards exercise," giving attention to the merits of the data but doing so more concisely under one theme rather than three. Another example of this process was the theme "Comorbidity that affected exercise routine," which was made up of codes that highlighted illnesses that increased the difficulty to exercise but following the inductive process of thematic analysis showed that this theme could be collapsed, and the codes therein could be addressed under the theme "Impediments to exercise."

After further analysis, these were reduced to five themes. All the codes and themes were categorized and organized into a table (see Appendix D) that can be used to easily identify all relevant data. The thematic analysis clearly noted the cancer survivors' thoughts, feelings, and routines. There was no discrepant data, all interviews were included in the data analysis, and all collected data were relevant to the research question.

Evidence of Trustworthiness

To establish trustworthiness of the study and its results the standards of credibility, transferability, dependability, and confirmation were strictly maintained

(Ravitch & Carl, 2016). Credibility was ensured by adhering to the qualitative research design. Collecting all data without prejudice and recording it accurately, free from subjective influence or manipulation. Transferability was based on the participants' experiences being faithfully recorded and transcribed, with details and contexts allowing for comparisons to other or similar situations (Ravitch & Carl, 2016). The detailed description of data collection, data analysis, and the participants' answers to documented interview questions established dependability or consistency of the study. My role as a researcher therein is acknowledged along with any possible biases I might have. However, objective data collection, confirmable data recordings, participants' ability to review interviews, strict transcription of each interview, and relative neutrality all contributed to confirmability of the data.

Results

The data review and analysis established recurring experiences that were shared by most cancer survivors during their in-depth interviews. The commonalities along with the perspectives that were relevant to the research question, which was, What is the role of psychological factors in cancer patients' continuing to engage in exercising after cancer diagnosis? provided the basis for coding and the inductive approach to theme development. Themes, related codes, and the number of participants that ascribed to each theme are outlined in the thematic analysis tables (attached below). There were 5 themes that emerged from data collection and analysis.

Theme 1: Downside of Not Exercising

Every participant of this study expressed an understanding and belief of negative consequences associated with not exercising. However, only 40 percent of the participants ascribed to this particular theme specifically. Statements such as “not being active makes me more tired and have less energy,” “inactivity makes everything worse,” “I don’t feel happy when I don’t exercise,” or “I have gastrointestinal problems if I stop working out” were the basis of the first theme and its associated codes. Participant 10 stated:

> My body doesn’t work well when I don’t exercise. When I exercise everything goes well. When I don’t exercise, I’m not happy. I started running track when at 14 years old, when I got into high school and running really helped me. I used to be so constipated, it was so bad and when I joined track, all over sudden I started to feel better, I’ve been running ever since.

Furthermore, participant 2 ascribed to this theme by stating: “Missing one day of exercise upsets my schedule momentum. When I don’t work out, I lack energy.” The downside of exercising seemed more prevalent among the participants who had higher frequency and intensity exercising routines. Participant 8 stated: “Inactivity makes everything go downhill.” It appeared that despite the life-changing illness of cancer the described experience of the survivor highlighted a belief that things would only worsen if their exercise routine were to cease. Another experience was described as “inactivity makes me feel lethargic” by participant 9.

Cancer survivors who maintained a regular routine of exercise before their diagnosis experienced negative mental, emotional, and physical effects when something interrupted their workout routine, yet during their cancer treatment the worries about the downsides of not exercising seemed to increase based on their testimony.

Theme 2: Benefits of Exercising

This theme was ascribed to by 80 percent of participants. The open-ended interview questions that addressed cancer survivors' exercise experienced (e.g., "During your exercising did you feel any changes in your thoughts or emotions?" "How would you describe your level of stress before, during, and after your physical activity?") resulted in recurring codes of positive associations with exercising. Subjects facial expressions and body language was positive when speaking about their exercise routine, and was evident in expressions such as "I just feel good when I work out," "I feel better when I stay active even when it's hard to do so," "Muscle soreness lets me know I did something right and that makes me feel good," "Exercising benefits my body and my mind," and "My cardio improves my mood," were common. Participant 2 stated:

> Cardiovascular workouts help my mood a lot more. What could contribute to that as well is being outside while doing it, the fresh air, getting the blood pumping. I would say along with the vitamin D from being exposed to the sun. So, I would say that cardiovascular workouts outside help my mood more so than being inside and lifting weights.

The theme, benefits of exercise, was strongly supported by all participants except two. For example, participant 1 mentioned: "Outdoor exercise and nature lifted my mood", participant 2 expressed: "Exercise helps me overcome feelings of anxiety and depression." The interviews showed that cancer survivors experienced a positive change in their mood and state of mind during their exercise routines, as participant 3 expressed: "Cardio helps me! It was also interesting to note that participants didn't just highlight physiological benefits of exercise, but mental, emotional, and marital. Participant 7 stated:

> I love working out with my husband as well, that's just really, really lovely time to be able to walk and talk. It helps me alleviate stress, just getting those endorphins going, it helps, and not just stress related to this, but with stress of life, like stress of the pandemic, those kinds of things.

Theme 3: Motivators to Exercise

The percentage of participants that ascribed to this theme was 100 percent. A cancer diagnosis is among the most challenging experiences in life, and cancer treatments such as surgery, chemotherapy and radiation are often debilitating and can cause patients to experience nausea, pain, depression, and fatigue. Hence, the motivational factors that helped cancer survivors to keep an exercise routine despite such deleterious variables were of great interest. Participants expressed strong convictions and were quite determined to adhere to physical activity despite cancer. One participant said: "Don't allow cancer to become your god!" "Exercise is who I am!" Another stated: "Exercise is my coping mechanism for stress." Others expressed various motivational factors such as, "Anger over my disease makes me want to run more," "Exercising allows me to spend time with my husband and I crave that," "I work out to feel good about myself," "My faith sustains me and keeps me going," "I love being outdoors it lifts my spirit," and "Doing things with my pets gives me pleasure." Participant 7 stated:

> I love it! I love to be outside! I love to walk, especially when I get to walk where it is incredibly beautiful! It is very calming. I know when I do then I take care of my body my mind. Also, what I listen to when I walk, feeding my spirituality as well. Then I also get to walk with my husband and that's just a really, really lovely time to be able to walk and talk.

The participants' experiences highlight factors that seem to serve as motivators that help them overcome the potential barriers to exercise that are common for cancer patients as well as the associated psychological distress. In summary these motivators ranged from a refusal to allow cancer to take over the participants' life, identifying with exercise itself, listing exercise as a direct coping mechanism for stress, using anger as fuel for physical activity, desiring to spend time with loved ones while exercising, and simply wanting to be outdoors and exercising providing an opportunity for it.

Theme 4: Impediments to Exercise

Participants were very forthcoming about the significant impact cancer had on them, mentally, emotionally, and physically. This theme was mentioned by 100 percent of participants. Experiences were described as "I couldn't exercise after surgery, I had to wait," "I had a sloth like feeling after cancer diagnosis," "I was in excruciating pain that made it extremely difficult to move," "I had fainting spells and had to be really careful about anything I did," "This COVID-19 pandemic had restricted me and made me feel sicker," "I had so much swelling in my body, especially my legs that it was hard to move," "I just feel frustrated a lot," "I can't sleep," "I have many days of depression," "I have severe headaches that make me suffer," "I'm too anxious and worried," "I have no energy to work out," and "I have a hard time breathing when I work out now." Participant 1 stated:

> I'm not sure, it's just something in my brain. It's like trying to open a door or something, but it won't let me. It's like a fog. My husband has to finish my sentences when I get like that and on those days, I can't do much of anything!

Participant 4 explained: "After each chemotherapy I got weaker. I would force myself to work out, but my workouts lacked pep. I also had a harder time breathing." Participant 5 said:

> I got extremely hot. I was very nauseated. Your system just doesn't want it, you could smell it coming out of your pores, you could taste it. Sometimes I would sit there for eight hours doing chemotherapy and it's tough. I would tense up because I knew what was coming. Sometimes I felt so bad they had to pull the needle out, stop the treatment for a while then start it again. On those days when I got home, I was completely exhausted, too tired. I could not really do any physical activity until I recovered.

Participant 10 mentioned: "I had this pain all over sudden that was worse than childbirth. It was beyond anything I had experienced, and I didn't know what to do!"

The extensive number of codes associated with this theme (see Appendix D) suggest that maintaining exercise while undergoing treatment for their cancer presented numerous challenges. Participants were greatly impacted by the magnitude of their cancer diagnosis and treatment. Overall, their barriers to exercising were extensive and could be categorized under recovery from surgery, moderate to extreme fatigue, health care provider recommended restrictions, severe pain, sleep deprivation, mental and emotional distress, debilitating nausea, depression, dietary restrictions that impacted energy levels necessary to workout, fear of death, constant hospital visits and schedule changes, and a lack of physical strength.

Theme 5: Attitudes Towards Exercise

Attitudes towards a particular behavior have been often cited as determinants of whether the behavior, in this case exercise, will be performed. 100 percent of participants ascribed to this theme. The interview questions allowed study participants to openly express their thoughts and feelings about exercising before their cancer diagnosis and thereafter. Some of their expressions were as follows: “I was always very active, even more so before my treatment,” “I already had a workout routine that I stuck to,” “I worked out a least six days per week,” “I love to run and I run every day,” “I must exercise, I need it,” “I like walking,” “I try to take every opportunity to exercise,” “I would strongly advise anyone who can to exercise regularly,” “If I miss a day of exercise it upsets me,” and “I love to hike.” Participant 6 stated:

> I keep a high level of activity, going to the gym, lifting weights, doing cardio probably Three days a week and having what I would consider high activity with weights and cardio. I would stay in the gym for an hour and a half to two hours. I would strongly advice to exercise as it doesn’t just help the body but also your personality, and your thoughts and everything like that.

Collectively the attitudes towards exercise revealed great appreciation for physical activity before cancer diagnosis. Cancer survivors evidenced their positive associations with exercise by reporting high levels of activity in workouts, expressing a love for and an obligation to continue to exercise, welcoming physical soreness that is linked to working out, preferring to exercise over other forms of recreation, advising others to exercise, and feeling guilty or down when missing a single day of planned exercise, The interviews showed that participants' attitude toward exercise remain consistent, while their personal resources and limitations did change due to their cancer diagnosis. There was no discrepant data, all interviews were included in the data analysis, and all collected data was relevant to the research question.

Summary

Chapter 4 described the results of this study, highlighting code and thematic development via the inductive approach. The purpose of this study was to examine the experience of cancer survivors who maintained a regular routine of exercise. In this chapter the research conditions, the number of participants, the participants' demographics, the process for data collection and data analysis were outlined. Code and theme development are highlighted in Appendix D. Credibility, transferability, dependability, and confirmability were addressed as essential components for evidence of trustworthiness. The themes were supported with direct quotes from transcripts that provided the first step to code development.

The participants appeared forthcoming and elaborate in their answers during the in-depth interviews on Zoom videoconferencing. Each participant expressed that being diagnosed with cancer had a significant impact on their lives emotionally, economically, physically, or psychologically. The documentation of all recordings, transcripts, codes, and themes allows for clear and accurate reestablishing of the process involved therein. Overall, the research question, “what is the role of psychological factors in cancer patients’ continuing to engage in exercise after cancer diagnosis?”, was answered with the experiences of each participant, highlighting how they experienced significant impediments due to cancer diagnosis, treatment, and survivorship; yet their appreciation of the perceived benefits of exercise, their attitude towards exercising, as well as their understanding of the possible consequences of not exercising added to their motivational factors to continue a healthy exercise routine. Chapter 5 will summarize the study findings, discuss their significance in light of previous research, implications for positive social change and discuss both the study limitations and directions for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this qualitative study was to examine the psychosocial factors that may underlie cancer patients continuing or failing to continue to exercise after cancer diagnosis. I used a nonexperimental research design featuring semistructured, in-depth, qualitative, face-to-face interviews to gather data. Participant narratives were analyzed using the method of thematic analysis outlined by Braun and Clarke (2006). I analyzed participating patients' attitudes toward exercise despite the traumatic experience of cancer diagnosis, treatment, and fear of recurrence. The mere diagnosis of cancer often has a significant and deleterious impact on the well-being of an individual that varies in magnitude (Greenblatt & Saini, 2019).

Cancer directly compromises the physiology of a person, yet psychological factors such as depression, anxiety, insomnia, posttraumatic stress disorder, and fear of death, which are associated with this disease, can further exacerbate the illness (Greenblatt & Saini, 2019). Cancer treatments (e.g., chemotherapy, surgery, radiation, hormone therapy, immunotherapy, etc.) are focused on eradicating the cancer from the patient's body or at least prolonging the patient's life and reducing suffering, which is palliative care (Greenblatt & Saini, 2019). Nevertheless, many cancer survivors describe the side effects of chemotherapy as worse than the disease itself (Greenblatt & Saini, 2019).

However, it is quite difficult for most who battle cancer to maintain a regular workout routine. In this study, I investigated the experiences of cancer survivors who despite their cancer diagnosis were able to continue a regular workout routine. In Chapter 5, I will discuss and interpret the findings of this study, its limitations, and implications for positive social change. The findings of this study showed that all participants were significantly impacted and aware of impediments to exercise due to their cancer diagnosis, and treatment. However, the underlying factors associated with their continuing to maintain an exercise routine while coping with the psychological distress of their illness were based on understanding the negative effects of a lack of exercise, appreciating the benefits of physical activity, and having a strong belief that acted as a motivator for exercise, as well as a positive attitude toward working out.

Interpretation of the Findings

The findings of this study outlined the psychological factors associated with the experiences of cancer survivors who maintained a regular routine of exercise. The in-depth, semistructured interviews confirmed that cancer diagnosis, treatment, and survivorship are linked to psychological distress (see Gundelach & Henry, 2016). Furthermore, participants' expressions established an association between maintaining a regular workout routine and positive, mental, emotional, and physical benefits (Edenfield & Blumenthal, 2011). The data showed that there was a positive association between the experiences of depression, frustration, fear and negativity, a lack of motivation, and a lack of physical activity (APA, 2013). There was a consistent pattern of feelings of sadness, anxiety, fear of recurrence, fear of death, anger, sleep disturbances, pain, and difficulties of adjusting to the life-changing event of cancer diagnosis in the experiences of participants (American Cancer Society, 2021). Last, it was also evident that cancer-related psychological distress burdened survivors many years beyond diagnosis (Kuba et al., 2019)

In line with research findings that exercise training improves mental health (Gutman & Nemeroff, 2011), while yielding physiological and psychological benefits (Edenfield & Blumenthal, 2011) the recorded experiences of this study confirmed that participants who maintained a regular routine of exercise described feelings of happiness; a greater ability to cope with stress; positive mood changes; improved family relationships; and physiological benefits such as improved gastrointestinal functioning, energy increase, personality benefits, and strength increases. The findings of this study extended the literature in this area in that it provided first person accounts of cancer survivors who despite facing the psychological challenges associated with cancer diagnosis, treatment, and survivorship were able to maintain a regular routine of exercise. These findings may provide important information to other cancer survivors about managing this life-altering diagnosis and offer additional tools to health professionals as far as better understanding the motivators and barriers to physical activity in the cancer patients they treat.

Analyzing the findings in the context of the HBM showed that motivational factors were a key determinant to maintaining a regular routine of exercise for the cancer patients in this study (Glanz et al., 2008). Each participant expressed a desire to be healthy as a motivation for their continued exercising despite the obstacles or perceived barriers of cancer diagnosis, treatment, and survivorship (Wood, 2008). The motivational factor of perceived benefits of exercise was highlighted by the experiences of cancer survivors. Nevertheless, the perceived barriers to exercise due to cancer were considerable. Each participant expressed multiple factors of limitations on their energy levels, strength, and mobility due to cancer diagnosis and treatment. Yet, in relation to HBM their self-efficacy, commitment to exercise, and their attitude to execute this behavior seemed to assist them to continue to maintain a routine of physical activity despite the perceived barriers (Wood, 2008).

In the light of the TRA, which focuses on behavioral intention as the crucial component of adopting health behaviors (Glanz et al., 2008), the interviews confirmed an overall positive attitude toward the behavior of exercising regularly. Participants highlighted this in their experiences. Hence, it appears that cancer survivors who expressed a love for and positive feelings toward exercise met the criteria outlined by the theoretical framework of TRA that this attitude was the basis for their behavioral intention to adopt this health behavior.

Lastly, the TPB is based on an individual's perceived control over a particular behavior, as well as their self-efficacy or confidence to perform the behavior (Glanz et al., 2008). The perceived control over behavioral performance is linked to a person's perception of the degree to which various environmental variables impact their ability to do so (Glanz et al., 2008). In this study environmental factors were related to participants having to spend more time in the hospital, having to protect themselves from sun exposure, or being restricted to their home due to surgery related limitations. The interviews revealed that environmental factors did impact frequency and intensity of exercise. TPB also factors self-efficacy into the probability of performing a health behavior. This refers to the degree of confidence that a person has in their ability to execute the behavior despite barriers (Glanz et al., 2008). Participants described a plethora of challenges and obstacles in their interviews that were linked to their cancer diagnosis, their family dynamics, and their cancer treatment. However, they also expressed a desire not to be overcome by self-pity and rather tried to focus on what they were still able to do. It appears that this determination to focus on what they could do was linked to their confidence to continue to exercise even though their level of intensity or frequency was lower than before their cancer diagnosis. The experiences of the cancer survivors in this study extended our understanding of the reasoning factors behind the decision participants made to continue exercising, as well as how they were psychologically impacted by cancer. It has been clear that cancer is physiologically and psychologically taxing, and that exercise provides many health benefits, however, the experiences in this study help to bridge the gap between knowledge, understanding, and application. The participants' experiences could provide other cancer survivors, as well as health professionals with another key to application.

Limitations of the Study

The delimitations of the study were based on the inclusion criteria of participants who were at least 18 years old, who had been diagnosed with cancer, had fluent English proficiency, and maintained a regular exercise routine. The study had 10 volunteers who were willing to participate in the in-depth, semistructured interviews and who consented by replying to the emailed consent form affirmatively. Limitations included the COVID-19 pandemic, which impacted the recruitment and interview process.

Recruitment had to be done via social media, and interviews had to be conducted through Zoom videoconferencing. This prevented utilizing in-person recruitment at hospitals or care facilities, as well as the additional cues of body language that are more readily apparent in in-person interviews and interactions. The online research process also automatically excludes individuals who do not have internet, needed devices, and/or the ability or understanding of how to operate on such platforms (Creswell, 2009).

The smaller sample size could be considered a limitation; nevertheless, the in-depth interviews and the process of data collection and data analysis ensured saturation as well as clear theme development. As the inclusion criteria required participants to have an exercise routine already there is a limitation in application to cancer survivors who might never have been physically active but who would like to start a workout program after diagnosis or during treatment.

Additionally, participants might have had a higher degree of stress and depression because of the COVID-19 pandemic that was underway during data collection. The restrictions, illness, and death due to the pandemic might have contributed reported psychological distress in volunteers, for instance. On the other hand, motivational factors could have been diminished during this pandemic. Yet, participants stayed focused on the research questions and the pandemic itself was not a focus when they outlined their experiences.

The study methodology was followed as outlined in the sampling procedures, instrumentation, data collection, and data analysis in Chapter 3. I followed my outlined role as a researcher during data collection, data analysis to ensure credibility. The recorded experiences of cancer survivors were faithfully transcribed without altering their input to allow for transferability. The qualitative research design was followed, and all outlined steps were adhered to allow for dependability and confirmability (Ravitch & Carl, 2016).

Recommendations

Possible future recommendations for a study with the same qualitative design, methodology, and boundaries would be to conduct the study post-pandemic restrictions to eliminate the possible confounding effects such as depression from restrictions or limitations on when and where participants can exercise. An additional recommendation would be to do follow-up interviews with cancer survivors to collect further data on their experiences, allowing them to elaborate on their initial interview and gaining further insight into how their relationship to exercise, in the context of cancer survivorship, continues. Last, I recommend that the experiences of health care professionals be considered to see their perspective on cancer survivors who continue to maintain a regular exercise schedule despite their diagnosis and associated psychological distress. Combining the experiences of cancer survivors with the experiences of health care professionals who are involved with treatment and care could give a more complete understanding.

Implications

The potential impact of this study on positive social change is based on the gap in literature that it addressed. There has been a general and professional awareness of the psychological distress associated with cancer diagnosis and treatment, as well as an awareness of the benefits of maintaining a regular routine of exercise. However, the experiences of cancer survivors who have first-hand knowledge of both topics was unique to this study. The in-depth interviews revealed that participants were not immune to the psychological and physiological challenges of cancer, nor did they try to deny them. Rather, they acknowledged the impediments to their regular routine of exercise but did not allow these to paralyze them. Their motivations to continue to exercise, their evaluation of the potential benefits of exercise, and their attitude toward maintaining a regular exercise routine could have a positive influence on individuals facing the life-changing event of cancer diagnosis as well as those who have been living with it but perhaps are struggling to overcome the barriers to adopting healthy behaviors such as exercising regularly.

Additionally, the findings in this study showed that many of the participants valued engaging in their routines of physical activity with their spouse, family, or friends. Therefore, it could be beneficial for family members and friends of cancer survivors to become familiar with the findings of this study, thus gaining a better understanding of what their loved ones are facing and in turn be better able to offer support.

Each year there are about 1,685,210 new cases of cancer in the United States, and an estimated 595,690 diagnosed individuals die from cancer (National Cancer Institute, 2017), creating a significant workload on healthcare professionals at many levels. Healthcare professionals are not just faced with treating cancer itself, but in addition they are trying to help patients with the manifestations of psychological distress in the form of depression, anxiety, posttraumatic stress disorder, hopelessness (Greenblatt & Saini, 2019), and even suicidal ideations (Amiri & Behnezhad, 2019). The findings of this study may assist healthcare staff to better understand the experiences of cancer survivors and what helps them to overcome the impediments to maintaining a regular routine of physical activity, and cope with the psychological factors of cancer diagnosis, treatment, and survivorship (Gundelach & Henry, 2016). The study findings allowed for a comparison between the theoretical frameworks of HBM, TRA, and TPD, making a connection between participants' experiences and motivational factors, perceived benefits, perceived barriers, attitudes toward, intentions, and execution of health behaviors. This connection between the theoretical framework and the actual lived experiences of cancer survivors could allow health professionals to design interventions for patients that might assist them in the battle against cancer and the associated psychological factors.

Conclusion

This qualitative study examined the psychological factors that may underlie cancer survivors' continuing to exercise after cancer diagnosis, as well as during and following their cancer treatment. The in-depth interviews clearly highlighted the physiological and psychological stress that cancer patients undergo from the point of their diagnosis to treatment, and survivorship. Participants did not portray a journey of ease when maintaining their regular exercise routine amid this life-threatening illness. Their expressions provided the basis for this study’s objective to gain a deeper understanding of the experiences of cancer survivors who maintain a healthy routine of physical activity despite the challenges of psychological distress and physical limitations.

The study participants described their experiences related to how they were able to continue to exercise after cancer diagnosis. They explained their own understanding of possible negative consequences of discontinuing to be physically active, a significant appreciation of the benefits of exercising, their personal motivational factors that drive them beyond the impediments to exercise, and how this relates to their overall attitude toward working out. The interviews revealed recurring themes of negative experiences when participants did not work out, comparing those periods to when they did exercise and evaluating them as less desirable. They reported that experiences when their exercise routines were maintained, even at a lower frequency or intensity, were positive and enjoyable. These expressions of appreciation, as well as determination while battling cancer could serve as motivation and guidance to other cancer survivors who are newly diagnosed or who have been fighting this disease for some time. Additionally, health care professionals and clinical staff could benefit from considering the experiences of the cancer survivors interviewed in this study in terms of designing interventions and having a better understanding of the thoughts and feelings of cancer survivors when prescribing treatment. Cancer support organizations and groups could utilize this study’s findings to assist them in their efforts to aid the millions of individuals who are affected every year by cancer.

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Appendix A: Open-Ended Interview Questions

The research question for this study was, What is the role of psychological factors in cancer patients' continuing to engage in exercise after cancer diagnosis? I designed the following open-ended interview questions to elicit information to answer and satisfy the research question.

1. How did you feel when you were first diagnosed with cancer?
2. Have you started cancer treatment? If not, will you choose to do so (why or why not)?
3. What were your thoughts regarding cancer treatment?
4. Did fatigue affect you when you wanted to work out?
5. Was depression (anything from occasionally feeling sad to clinically diagnosed major depressive disorder, per the *DSM-5*) a factor that made working out a challenge? How did you deal with it?
6. During your physical activity did you feel any changes in your emotions, or thoughts?
7. How would you describe your level of stress before, during, and after you engaged in physical activity?
8. Were there days that despite your desire to work out it was not possible for you to do so? What factors were involved and how did they affect you?
9. Did your workout experience differ after your cancer diagnosis from how you felt during a workout before you were diagnosed? Have you undergone cancer treatment and if yes, how did this impact you?

10. What were some factors that motivated you to exercise before and after cancer?
11. Are there certain emotions that you’ve found make it more difficult for you to exercise? How do you deal with them?
12. What would be your advice to others who are diagnosed with cancer when it comes to maintaining physical activity/exercise after cancer diagnosis?

Appendix B: Social Media Post

Walden University Doctoral Candidate is seeking research participants who are cancer survivors and who are willing to share their experience in an interview to help further the understanding of the psychological factors involved in living with cancer. Volunteers have to be at least 18 years old and meet the inclusion criteria specified. If you would like to be considered, please email me at @university.edu or send me a private message using the Facebook “send message” feature.

Appendix C: Demographic Survey

Please fill out the information below. All information will be kept confidential and will solely be used for the purpose of this study.

- Age:
- Sex: Male [ ] Female [ ]
- Race:
- Ethnicity:

Appendix D: Themes and Associated Codes

Themes and Associated Codes.

Themes:	Downside of Not Exercising	Benefits of Exercising	Motivators to Exercise	Impediments to Exercise	Attitudes Towards Exercise
1.	Inactivity equals lethargy	I feel better exercising	Don’t allow cancer to ruin your life	Recovery from surgery stopped exercising	Very active before cancer
2.	Inactivity makes everything worse	I feel better active	Well balanced died and plenty of sleep.	Treatments prevented activity	Exercise routine before cancer
3.	When I don’t work out, I lack energy	People who exercise are happier	I don’t want to die	Sloth like after cancer	Maintained an exercise routine before cancer
4.	Constipated without exercise	Walking makes me feel good	Instinctive feeling to exercise	Felt restricted by cancer	Very active before cancer
5.	I’m not happy without exercise,	Soreness makes me feel good	Exercise is who I am	12 surgeries impacted activity	High level of activity before diagnosis
6.		I love to be outside	Deal with stress by exercising	Excruciating pain prevented exercise	I was always very active
7.		Outdoors’ exercise makes me happy	Exercise for positive emotions	Treatments were painful	I already had a workout routine
8.		Exercising helps my body and my mind	No exercise leads to physiological problems	Surgery comes first	Workout routine before cancer

9.	Exercising alleviates stress	Don’t let emotions stop you from exercising	Doctor visits stressful	Work out six days per week
10.	Exercising alleviates stress	Nothing stops me from running	Treatments inconvenient for exercise	Walking 15 miles per week,
11.	Exercise is helpful	Anger as a motivator for exercise	Pain worse than childbirth	Work out seven days per week,
12.	Walking is helpful	I like exercising with my spouse	Diagnosis affected me adversely	Love to run, I run every day,
13.	Exercise helps physically	Working out together helps	Fainted	Stretching is a must,
14.	Exercise helps mentally	My spirituality helps me	Insomnia affects activity	I must exercise
15.	Exercise the greatest relief	Faith sustained me	Pain	Exercise six times per week,
16.	Cardiovascular exercise helps me	Physical activity with spouse is fun	Cancer is like a monster inside of you	I like walking
17.	No anxiety during my workouts	Positive attitude keeps you active	Don’t let cancer become your god	Soreness lets me know I did something right,
18.	Weightlifting makes me see more results	I trusted in God	Shock	Exercise four to five times per week
19.	Cardiovascular exercise improves mood	Talking helps	Disbelief stunned me	Walk 25 miles per week

20.	Outdoor activity adds to positive feelings	Keep moving it helps	Anger	I love exercising,
21.	Much more energy when I keep my workout routine	Fitness through diet	COVID-19 made me sicker,	Take every opportunity to exercise,
22.	Exercise has improved my emotional state	Eating less meat makes me feel better	Surgery and radiation left me immobile	Don’t stop being active,
23.	Exercise gives a feeling of satisfaction	Outdoors’ activity lifts spirits	Chemotherapy was the worst	If you can then workout,
24.	Stress relief after working out	Nature lifted mood	Chemotherapy left me inactive	Regularly go to gym,
25.	Exercising keeps me balanced	After exercise I feel great and glad	Weight gains from therapy	Three days per week 2 hours per workout,
26.	I have more energy	My pets give me pleasure	Swelling kept made it hard to move	Continued working out but less,
27.	Exercise helps your personality		Treatment reduced my activity by 75 percent	Walking 5 miles,
28.	Experience that exercising overcomes feelings of		Treatment reduced my workout days	Able to work out again,

	anxiety/depression		
29.	When I stay active, I feel great	Frustration	Strongly advise to exercise,
30.	It feels good to exercise	Feel more tired since cancer	Working out helps my thoughts,
31.		Sleep problems	Fighting for a positive attitude,
32.		Days of depression	Stay active,
33.		I can’t move I’m in pain	You need to keep busy to live,
34.		Headaches make me suffer	I stuck to my routine,
35.		Fibromyalgia,	Walking exercises consistently,
36.		I can’t breathe during my work out	I was devastated but stuck to my routine,
37.		Too worried to work out	Forced myself to exercise,
38.		Chemotherapy made me too tired	Keep up the exercise despite cancer,
39.		I was in pain	Cardiovascular exercise for an hour,
40.		I feel restricted because of cancer	Walk seven days per week,
41.		Frustrations affect exercising	Stair climbing exercise three days per week,
42.		Cancer won’t let me do everything I would like to	Predisposition to be physically active,

43.	I’m more stressed	Self-actualization
44.	I’m stressed because I’m worried	Belief that exercising is necessary
45.	Sun prevents me from exercising	Try to have an appreciative attitude,
46.	Being worried and anxious affected my activity	Mood affects desire to workout,
47.	Shock paralyzes activity	Missing a day of exercise upsets me,
48.	Doctor recommended no exercise	Missing one day of exercise makes me lose momentum,
49.	Dietary restrictions zap energy	Exercise routine is important,
50.	Diet made me fatigued	Start of small in exercising,
51.	Diet made me stressed	Increase exercising routine gradually,
52.	Drastic weight loss	Before exercise I’m stressed, during exercise I feel stress,
53.	Mentally taxing	I love to hike,
54.	Some days unable to get motivated	
55.	Limitations were stressful	
56.	Limitations were frustrating	
57.	Fear of death affected my activity level	
58.	Chemotherapy for eight hours	

59.	Feeling of dread was paralyzing
60.	Too tired to workout
61.	Chemotherapy made me unable
62.	Limitations
63.	My energy isn’t like before
64.	I’m more tired
65.	Very tired
66.	Chemo made me weaker
67.	I lost strength
68.	Things get in the way of exercise
69.	Pandemic made working out harder
70.	Felt fatigued
71.	Depression
72.	Struggle to get motivated
73.	Struggle to stay motivated
74.	Dealing with cancer gets me fatigued
75.	New limitations are new frustrations
76.	Busy schedule interrupts workout routine
77.	I feel anxiety,

78.	Lack of understanding reduces motivation to exercise
79.	TV instead of exercise
80.	Instant gratification
81.	No energy
82.	I couldn’t do much
83.	Diagnosis depressed me
84.	Seasonal changes affected my activity and mood
85.	Brain doesn’t work with chemo
86.	brain is in a fog
87.	“Chemo brain”
88.	Days where I feel incapacitated
89.	Before cancer I was physically fitter
90.	Before cancer I was able to do more,
91.	Tired
92.	No strength
93.	In pain
94.	Anxiety attacks hinder me
95.	My workouts lacked pep

Appendix E: Participants' Demographics

Participants' Demographics and Cancer Diagnosis

Participant#	Sex	Age	Marital Status	Diagnosis
1	F	70 years	Married	Metastatic Breast Carcinoma
2	M	33 years	Married	Appendiceal Cancer
3	F	50 years	Single	Invasive Lobular Carcinoma
4	F	75 years	Widowed	Triple Negative Metastatic Breast Cancer
5	M	71 years	Married	Non-Hodgkin's Lymphoma
6	M	50 years	Married	Mandibular Odontoma
7	F	56 years	Married	Basal Cell Carcinoma
8	F	53 years	Married	Primary Lung Adenocarcinoma & Metastatic Brain Tumor
9	M	50 years	Married	Melanoma
10	F	58 years	Married	Perineal Desmoid Tumor

Appendix F: Number of participants that ascribed to each theme

Number of participants that ascribed to each theme.

Themes:	**Downside of Not Exercising**	**Benefits of Exercising**	**Motivators to Exercise**	**Impediments to Exercise**	**Attitudes Towards Exercise**
Percentage of Participants that ascribed to themes:	40%	80%	100%	100%	100%

**Total Number of Participants was 10.*