



**UNIVERSITY of
RWANDA**

**EVALUATION OF FATIGUE AND PHYSICAL ACTIVITY AMONG ADULT
CANCER PATIENTS RECEIVING CHEMOTHERAPY AT SELECTED DISTRICT
HOSPITAL OF RWANDA**

By

NYINAWASE MARIE CLAIRE

218000118

A dissertation submitted in partial fulfillment of the requirements for the degree of
Master of Sciences in Nursing, College of Medicine and Health Sciences

ONCOLOGY TRACK

September, 2019

KIGALI, RWANDA



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SUPERVISOR: Dr DARIUS GISHOMA

CO-SUPERVISOR: Mrs RUTH SEGO

JUNE, 2019

KIGALI, RWANDA

DECLARATION

This thesis is a presentation of my original work. Wherever contributions of others are involved, every effort is made to indicate this work clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions.

The work was done under the Supervision of Dr Darius GISHOMA as the Supervisor and Ruth Sego as the Co-Supervisor, at the University of Rwanda College of Medicine and Health Sciences, School of Nursing, Oncology track.

NYINAWASE Marie Claire

DEDICATION

I wish to dedicate this work to the almighty God who blessed me with knowledge and gave me the ability to conduct this study. In addition, the work is dedicated to my beloved husband Hormisdas Ndayishimiye, my daughters Anaïs and Davina, and to my entire family for their support and encouragement throughout my study.

ACKNOWLEDGEMENTS

It is with the deepest sense of gratitude of the Almighty that gave me strength and ability to successfully complete this research.

I would like to express my sincere appreciation to my supervisor Dr.Darius GISHOMA and my co supervisor Ruth Segó for their encouragements, guidance, and valuable advices that led to the completion of this work.

I am greatly indebted to the management of CHUB for their support, understanding during this course: I feel that I owe you so much.

I am very thankful to my direct family: my husband, my daughters Anaïs and Davina, and my entire family for their care and all the support provided to me throughout this journey. Their support, patience, tolerance and understanding have not only helped me to complete this project, but have enabled me to succeed on all aspects of the course.

Many thanks go to my fellow classmates for their support and friendship.

Thanks to the entire Butaro Cancer clinic staff for their assistance during the data collection period.

Many thank to the patients with cancer who have inspired and helped to expand our knowledge, insight and enhance our ability to make your lives better.

ABSTRACT

Background: Cancer is defined as a group of diseases characterized by the uncontrolled growth and spread of cancer cells. Cancer patients receiving chemotherapy experience most clinically fatigue than other symptoms, which interferes with their general physical activity. Several studies have shown the benefits of physical activity on fatigue during and after chemotherapy treatment.

The aim of this study is to evaluate fatigue and physical activity level among adult cancer patients receiving chemotherapy.

Methods: A cross-sectional study design with a non-experimental quantitative approach was used to meet the objectives of the study. A systematic sampling technique was used to select a sample of 154 participants among patients on chemotherapy at Butaro hospital. The data were analyzed quantitatively and where necessary relationship between fatigue, physical activity and socio-demographic variables were reported at 0.05 margin error and 95% confidence interval.

Results: The results showed least level of fatigue among study participants (66%), most of the participants were reported to be active on physical activity scale. Fatigue was reported to be associated with interference to general activities ($P=0.00$). Most socio-demographic variables were reported not to be associated with the levels of fatigue as well as physical activity.

Conclusion and recommendation: Majority of the study participants reported to suffer from breast cancer and the least level of fatigue among patients on chemotherapy was reported. It was also realized that participants were active on physical activity scale. The targeted interventions to maintain physical activity levels of the participants are encouraged to sustain and improve the current situation.

Key words: Fatigue, Physical activity, Cancer, Chemotherapy

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LIST OF SYMBOLS AND ACRONYMS/ABBREVIATIONS

| | |
|-------|--|
| QoL | Quality of life |
| WHO | World Health Organization |
| RCTs | Randomized controlled trials |
| CRF | Cancer related fatigue |
| ACSM | American College of Sport Medicine |
| AD L | Activities of daily living |
| ANCCN | American National Comprehensive Cancer Network |
| ICD | International Classification of Diseases |
| CMHS | College of Medicine and Health Sciences |
| FSI | Fatigue symptoms Inventory |
| PA | Physical activity |
| IPAQ | International Physical Activity Questionnaire |
| IARC | International Agency for Research on Cancer |
| NCDs | Non Communicable Diseases |
| SDGs | Sustainable Development Goals |

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter goes through the background of the study, the problem statement, the aim of the study, objectives, research questions, critical review, the gap identification and conceptual framework adopted from Imogene King Theory of goal attainments.

1.2 Background

Cancer is the name for a group of more than 100 diseases and it is defined as a disease in which cancer cells divide, grow without control and can spread to surrounding tissues and, can cause severe illness and death when it is not treated(ACS, 2017).The World Health Organization (WHO) has largely defined environmental factors of cancer as those in which extrinsic factors are responsible, while genetic defects associated with cancer are defined as those with an extremely high probability of developing one or more particular cancer case, regardless of environmental factors (Warnock, 2018).

The cancer global pattern disease was estimated to increase up to 18.1 million new cases and 9.6 million deaths in 2018 worldwide. It is reported that one in 6 women and one in 5 men develop cancer disease during their lifetime; one in 11 women and one in 8 men die from cancer disease. The prevalence in 5 years is estimated to be 43.8 millions(WHO, 2018).About half of the new cases and more than half of the cancer deaths, , were estimated to occur in Asia in 2018men and women combined altogether. This is in part because the region has nearly 60% of the global population. The Europe accounts for23.4% of the global cancer cases and 20.3% of the cancer deaths, even though it contains only 9.0% of the global population. America has13.3%of the global population and accounts for21.0% of incidence and 14.4% of mortality worldwide. Contrary to other world regions, the proportions of cancer deaths in Africa and in Asia (57.3%and 7.3%, respectively) are higher than the proportions of incident cases(48.4% and 5.8%, respectively),because these regions have a higher frequency of certain cancer types associated with poorer prognosis and higher mortality rates, in addition to limited access to timely diagnosis and treatment in many countries of the continent(WHO, 2018).

Pathophysiology of fatigue related to chemotherapy is still ambiguous and a variety of mechanisms may contribute to its development(Fu *et al.*, 2019).These mechanisms refer to the effects of cancer and its treatment on neuropsychological impairment, muscle metabolism dysregulation, mediators of inflammation and stress, hormonal changes related to the effects on the hypothalamic pituitary axis, immune activation, and mainly premature menopause in women, or androgen deprivation in men(Fu *et al.*, 2019).

The WHO Global Report on non-communicable diseases (NCDs) addresses several risk factors for cancer. These include including tobacco use, alcohol consumption, lack of physical activity, unhealthy diet, genetic factors predispositions and oncogenic infections (Vineis, Paolo, wild, 2014).

Fatigue has been described by patients with cancer as a significant problem that is mostly coupled with difficulty in performing physical activities than any other side effects associated with cancer treatment such nausea, vomiting or feeling pain (Kassab, 2017). Cancer treatment is prone to cause cancer related fatigue(CRF) and to worsen the existing fatigue, chemotherapy was associated with severe CRF in patients with different types of cancer(Wang and Jeanie F. Woodruff, BS, 2015). As effective fatigue interventions are lacking, cancer patients often accept fatigue as the price to be paid for achieving a cure (Wang and Jeanie F. Woodruff, BS, 2015).

The CRF effect on the ability to perform activities of daily living is both profound and pervasive. In a study which was conducted among patients with cancer and a history of chemotherapy treatment, it was reported that most of patients with fatigue (91%) felt that it prevented a normal life, and 88% felt that their fatigue had affected their physical activities. Patients with cancer related fatigue have reported significant impairment in their ability to perform a variety of activities of daily living, including preparing food, cleaning the house, light lifting, and social activities with friends and family (Hofman*et al.*, 2017).

According to the American National Comprehensive Cancer Network.(ANCCN) and the Oncology Nursing Society, CRF management strategies focus on patient, family education and counseling, physical activity and other behavioral interventions, psycho stimulants, and treatment of contributing factors, such as pain, emotional distress, sleep disturbance, and anemia(Wang and Jeanie F. Woodruff, BS, 2015).

According to Imogene King's Theory of Goal Attainment, the role of nursing is to help patients to maintain their well being so that they can function in their roles. When a patient is being evaluated for CRF and physical activity, the health care provider and the patient must decide upon mutual goals (Beverly J whelton, 2017).

As the world move forward in the war geared towards removing or reducing pain, there is a need to move forward equally in the war against fatigue related to chemotherapy: this study intended to study the level of fatigue and physical activity among adult cancer patients receiving chemotherapy.

1.3 Problem statement

Cancer pattern in Rwanda is a new phenomenon and needs much attention. In fact, when CRF is assessed and physical activity is performed at regular basis, this helps to improve the quality of life of patients receiving cancer treatment.

The clinical experience probed the curiosity to study on fatigue by doing a follow up cancer patients during and after chemotherapy and its associated levels of physical activity.

The National Comprehensive Cancer Network (NCCN) defines cancer-related fatigue (CRF) as "a persistent, subjective sense of tiredness related to cancer or cancer treatment that interferes with usual functioning (Hilarius, Kloeg, van der Wall, Komen, Gundy, & Aaronson, 2011).

A study done on CRF and treatment related fatigue shows that cancer treatment is known to be the source of CRF and to worsen the existing fatigue experienced by the patient(Wang and Jeanie F. Woodruff, BS, 2015). The same study showed that when effective fatigue interventions are lacking, patients often accept fatigue as the price to be paid for achieving a cure.

The National Comprehensive Cancer Network revealed that patients with cancer receiving chemotherapy identify fatigue as an important problem which affects their daily activities for more of the time than either nausea/vomiting or cancer pain. Therefore, the CRF negatively impacts a patient's general physical activity and diminishes quality of life. CRF lasts longer than usual fatigue and is more severe and unrelenting. CRF can be so overwhelming that a patient may request a chemo holiday or may even elect to discontinue therapy altogether. In

either case, curative treatment may be compromised(Wang and Jeanie F. Woodruff, BS, 2015). The researchers in the study assert that assessment, screening, evaluation, and treatment for CRF in clinical settings remain suboptimal and may cause clinicians' failure to offer interventions, patients' lack of knowledge of appropriate treatments for fatigue, a desire on patients' part to treat fatigue without medications, and a tendency to be stoic about fatigue to avoid being labeled as a "complainer" or risk having the dose of anticancer treatment reduced(Wang et al., 2015).In addition to this, it is reported in the same study that Cancer related fatigue has been under reported, under diagnosed and undertreated (Wang et al., 2015).Other studies have shown positive benefits of physical activity during and following treatment, but some uncertainties remain about the optimal type and duration of physical activity (Kummeret al.,2013)

In Rwanda there is scarcity of information on fatigue and physical activity among adult cancer patients receiving chemotherapy.

1.4The aim of the study

To evaluate fatigue and physical activity levels among adults cancer patients receiving chemotherapy at Butaro Cancer Center of Excellence.

1.5 Research objectives

- To determine the level of fatigue among adult cancer patients receiving chemotherapy at Butaro Cancer Center of Excellence.
- To determine the level of physical activity among adult cancer patients receiving chemotherapy at Butaro Cancer Center of Excellence.
- To describe the associations between fatigue and physical activity among adult cancer patients undergoing chemotherapy at Butaro Cancer Center of Excellence.

1.6 Research questions

- What is the level of fatigue among adult cancer patients receiving chemotherapy at Butaro Cancer Center of Excellence?
- What is the level of physical activity among adult of cancer patients receiving chemotherapy at Butaro Cancer Center of Excellence?
- What are the associations between fatigue and physical activity among adult cancer patients receiving chemotherapy at Butaro Cancer Center of Excellence?

1.7. Significance of the study

Fatigue is the commonest side effect of chemotherapy and radiotherapy: it has been shown that 65–100% of patients undergoing radiotherapy and up to 82–96% of those receiving chemotherapy suffer from fatigue during their course of treatment and interfere with physical activity (Barsevick *et al.*, 2013). However, there are gaps in those studies on fatigue and physical activity. One of those is that little has been done in Rwanda in terms of research about that phenomenon. This research project has been undertaken to respond to the research gap on this phenomenon in Rwanda.

In view of this, the study had four major areas of significance.

1.7.1. Nursing research:

This study identified the experience of CRF among patients receiving chemotherapy throughout the information that was provided to nurses. Patients' practices related to CRF among cancer patients receiving chemotherapy were also revealed, and new opportunities were identified in order to provide the basis for further research in order to contribute to the improvement of CRF among patients receiving chemotherapy.

1.7.2. Nursing practice:

This study increased awareness about the practices in relation to CRF and patients' physical activity among nurses. Results of this study informed national healthcare policy makers and hospital administration in particular, to recognize gaps in assessment and management of CRF in order to develop strategies and guidelines to prevent or minimize CRF among patients receiving chemotherapy.

1.7.3. Nursing education, the results of the study are an additional source of information to the available literatures on this subject as well as a foundation for future research.

1.7.4. For nursing management, nurses will become aware of the status quo as far as cancer patients' level of fatigue and physical activity

1.8. Definition of key concepts

For the purpose of this study, the following terms are defined as follows:

Cancer:

Cancer is the general name for a group of more than 100 diseases, is defined as diseases in which abnormal cells divide without control and can invade nearby tissues, and untreated cancers can cause serious illness and death(ACS, 2017).

Cancer-related fatigue:

National Comprehensive Cancer Network (NCCN) defined CRF as “a persistent, stressful, subjective sense of tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning(Fu *et al.*, 2019).

Chemotherapy is the use of strong drugs to treat cancer.

Chemotherapy is the treatment of cancer by using chemicals that kill cancer cells. These anti-cancer drugs destroy cancer cells by stopping their growth and reproduction. The drugs may rarely be intended to have a local effect, but in most cases, the intention is to destroy cancer cells wherever they may exist in the body(Tierney, 2015).

Physical activity

Physical activity is defined as any bodily movement produced by skeletal muscle that requires energy expenditure. Physical activity can be undertaken in many different ways: walking, cycling, sports and active forms of recreation such as dance, yoga, tai chi.

Physical activity can also be undertaken as part of work (lifting, carrying or other related tasks(WHO, 2018).

1.8. Structure/Organization of the study

Our research work was subdivided into six main: the first chapter includes title page, declaration, acknowledgement, summary, table of contents, a list of symbols and abbreviations, a list of tables and a list of figures. The second chapter includes introduction, and third literature review,. While the forth chapter is about methodology, the fifth chapter is about results and interpretation, and sixth one deals with discussion and recommendations.

1.910. Conclusion of chapter one:

There is scarcity of literature about of CRF and physical activity in Rwanda. In this way a, the researcher is committed to conducting this study in order to contribute to the dearth of knowledge in the literature of nursing practice.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

The present chapter reports on both theoretical and empirical literature in relation with cancer and cancer management, as well as fatigue and its related physical activity among cancer patients in different settings.

2.2. Theoretical literature

2.2.1 Etiology of cancer

Worldwide, cancer is a leading cause of death in countries of all income levels. Related to the existing burden as the population growth, age, and adopt life style behaviors that expose to cancer, the number of cancer cases and deaths is expected to grow rapidly. The prevalence of cancer is becoming increasingly high in low income countries and in high income countries whereby any of the lifestyle risk factors, such as tobacco use, physical inactivity, excess body weight, and reproductive patterns are already prevalent (Torre, 2016).

The risk of most types of cancer is higher with a family history of cancer. This results primarily from the inheritance of genetic variations that give low or moderate risk and/or similar exposures to lifestyle, environmental risk factors among family members, as opposed to inheritance of genetic alterations that confer a very high risk, which occurs much more rarely. Relative risk is the strength of the relationship between exposure to a given risk factor and cancer which is measured by comparing cancer occurrence in people without a certain exposure to cancer, occurrence in people with this characteristic or trait (Siegel, Miller and Jemal, 2019).

2.2.2 Cancer staging

According to the American Joint cancer Committee (AJCC) in collaboration with the Union for International Cancer Control (UICC), the most clinically useful cancer staging system was the tumor, node, and metastasis (TNM). . The AJCC TNM system classifies cancers by the size and extent of the primary tumor (T), involvement of regional lymph nodes (N), and the absence or presence of distant metastases (M), supplemented in recent years by evidence based prognostic and predictive factors.

Once the T,N,M categories are determined, a stage of 0,I,II,III, or IV is assigned, with stage 0 being in situ where stage I is being early, and stage IV being the most advanced disease (ACS, 2017).

The appropriate therapy and assessing prognosis require proper cancer staging. For most cancers, staging is based on the size or extent of the primary tumor and whether the cancer has spread to nearby lymph nodes or other areas of the body (ACS, 2018).

2.2.3 Epidemiology

According to the literature, lung cancer and female breast cancer are the leading types of cancer worldwide in terms of the number of new cases. For each of these types, about 2.1 million diagnoses was estimated in 2018, contributing to about 11.6% of the total cancer incidence weight. Colorectal cancer contributes to 1.8 million cases with 10.2% of the total cancer cases, and is the third most commonly diagnosed cancer. Prostate cancer is the fourth (1.3 million cases, 7.1%), and stomach cancer is the fifth (1.0 million cases, 5.7%). Lung cancer was reported to be responsible for the largest number of deaths (1.8 million deaths, 18.4% of the total number), because of the poor prognosis for this cancer worldwide, followed by colorectal cancer (881 000 deaths, 9.2%), stomach cancer accounted for 783 000 deaths, 8.2% and liver cancer 782 000 deaths, making 8.2% of the total. Female breast cancer ranks as the fifth leading cause of death with 627 000 deaths accounting for 6.6%, and mainly the prognosis is relatively favorable developed countries (WHO, 2018).

2.2.4 Cancer management

The cornerstone of the cancer strategy is its prevention as it offers the most cost effective, long-term approach for cancer control. The percentage of cancer incidence attributable to modifiable lifestyle and environmental factors is estimated to be 30% to 40% range. Treatment of cancer may consist of a combination of surgery, radiation treatment (RT), chemotherapy (CT), or hormonal therapy (Department of Health and National Patient Safety Office, 2017).

Chemotherapy works by stopping or slowing the growth of cancer cells which grow and divide quickly without control. It is therefore used to treat different types of cancer and most often chemotherapy is used in combination with other cancer treatments where each type of treatment depends on the type of cancer, stage and other co-morbidities (Tierney, 2015).

Among the most common chemotherapy induced side effects are gastrointestinal disorders, hair loss and fatigue, bone marrow suppression, neuropathies, and skin disorders. Specific side effects of some drugs have also been associated with cardiotoxicity and pulmonary toxicity, respectively (Ismail, 2011).

The management of side effects related to chemotherapy is important to improve quality of life (QOL) of patients with cancer, which may eventually influence their willingness to complete the treatment (Chan and Ismail, 2014).

Each type of cancer treatment presents many challenges and side effects, which may be acute or chronic. Related side effects of treatments may include fatigue, alopecia, nausea, vomiting, taste changes, low blood counts, neuropathy, mouth sores, and diarrhea whereby cancer related fatigue (CRF) is the most commonly reported side effect of cancer treatment (Chan and Ismail, 2014).

Around 50%–90% of the cancer patients experience the burden of cancer related fatigue globally, the latter number resemble to the patients subjected to active anticancer chemotherapy and radiotherapy. CRF is not relieved by rest, although most evidence and research findings on CRF showed that CRF is still under diagnosed, undertreated, and underreported (Fu *et al.*, 2019).

CRF is regarded as a serious problem alongside cancer and its treatment. More than 60% of patients with cancer experience fatigue, depression and anxiety, sleeping problems, nausea, stress, and anemia. The patients should be screened for fatigue at the initial visits, identify the cause of fatigue and treatable factors, start its treatment along with the cancer treatment, and continue after cancer treatment is completed (Fu *et al.*, 2019).

Until the late 1980s pharmacological treatments were not seen due to the misperception of CRF as an inevitable and omnipresent consequences of cancer and its treatment. Later on, awareness of prevalence and impact of CRF increased and so did the concern on its original pathophysiology. Following to the greater awareness, research began focusing on identifying the therapeutic interventions starting initially from pharmacological treatment and later on non-pharmacological treatments (Fu *et al.*, 2019).

The measurement using accelerometers provide a wealth of opportunity to assess physical activity across a full range of intensity, and to explain the benefits of physical activity in

cancer patients and survivors. Understanding the true magnitude, duration, and frequency of daily physical activities in the population is important to enhancing recovery efforts and preserving quality of life for patients living with, or recovery from cancer(Schrack, et al., 2017).

The effectiveness of new and improved cancer therapies has also increased interest in the potential health benefits of physical activity during and after treatment. The growing of interest in the capacity of physical activity has become effective to combat the adverse physiologic and psychological effects of certain cancer treatments, improve body strength and reduce fatigue (Schrack, et al., 2017).The ANCCN guidelines recommend the consideration of physical exercise for managing CRF(Mustian *et al.*, 2010).

The present study is guided by Imogene King theory of goal attainment which puts patients with cancer at the center of treatment and explains the interrelationship between fatigue and physical activity. King theory shows that the role of nursing is to help individual to maintain their health so that they can be able to function in their roles(Beverly J whelton, 2017).

2.2. Empirical

2.2.1. Cancer Related Fatigue

Usually cancer develops in aged people. 87% of all cancers in the United States are diagnosed in people with more than 50 years of age. Certain life styles increase the risk to have cancer, such as eating an unhealthy diet, smoking, and being not physically active (ACS, 2018).The percentages of patients who experience CRF vary across studies from 25% to 100% depending on given treatment and the type and stage of cancer (ANCCN, 2013).

A study conducted in Sweden showed that fatigue is the most common symptom during treatment of cancer, where 70% to 100% of patients are affected by and/or report experiencing extensive fatigue (Browaliet *al.*, 2016).In South Africa, a study reported that cancer related fatigue (CRF) remains a major concern for both patients and health professionals, and that approximately 70%-100% of cancer patients experience fatigue (Bhyat *et al.*, 2014).Another study was conducted in Uganda and it showed that the negative experiences described in the theme ‘experiences related to the body’ reflect typical side effects of chemotherapy, such as fatigue, diarrhea and loss of appetite, as well as the inability

to perform daily activities during the initial days of treatment(Wang et al., 2015). The study showed that all those experiences compromise the patients' quality of life

It is asserted that the majority of patients with cancer receiving chemotherapy (86%) experience fatigue, and 73% cope with CRF by decreasing their activities and taking time to rest, taking care with their nutrition (12%), exercising (5%), reading newspaper or books (3%), listening to music (3%), drinking water (3%), watching television (3%), coping with the pain (3%), and massage therapy (3%). Those mechanisms enable the patient and the healthcare professionals to choose out of a variety of evidence-based alternatives according to patient wishes and abilities to deal with CRF (Hilfikeret *al.*, 2017).Another study showed thatduring chemotherapy treatment both the individual physical health and quality of life and emotional are affected (Pearce *et al.*, 2017). Lucia and colleagues explained the relation between cancer and CRF and found that 70% of people with cancer report feelings of CRF during and after adjuvant chemotherapy (Badr *et al.*, 2013).

The percentage of patients experiencing CRF varies widely in the literature, but it has mostly been reported to be between 40% and 100% of the overall number of patients with cancer. CRF is the most predicted side effect of cancer treatment, 95% of patients who are scheduled to receive chemotherapy or radiotherapy are expected to experience from some degree of fatigue during their treatment (Osina, 2017). Hofman and colleagues reported that more than 80% of patients receiving chemotherapy have CRF as a significant side effect of treatment. The same study found that 88% of patients who experienced chemotherapy reported that CRF had affected negatively their activities of daily living.

2.2.3 Physical activity in patients with cancer

Physical activity is one of the most supporting evidence of effective fatigue management specifying that the exercises have positive effects in improving fatigue symptoms, enriching physical performance, and enhancing patient quality of life(QOL).A study on home-based exercise program showed that exercises were capable of improving the mobility, fatigue, and sleep quality of patients with stage IV lung and colorectal cancer. Regular physical exercises improve the functional capacity, thereby reducing the effort to carry on daily activities(Fu *et al.*, 2019).

Physical exercise is an intervention modality that shows great promise in mitigating acute CRF experienced by cancer patients during treatment as well as chronic CRF they experience after completion of treatment(Osina, 2017).Studies have also demonstrated the positive effect

of physical activity for patients with advanced cancer. Most research on the mechanisms underlying the benefit of exercise for patients with cancer and survivors is derived from research in healthy populations (Barsevick *et al.*, 2013).

The guidelines from the American College of Sports Medicine (ACSM) recommend at least 150 minutes of moderate intensity aerobic activity each week, consistently to patients with cancer and survivors (Bower, Sciences and Cancer, 2015) A study conducted by Puetz and Herring (2014), showed that exercises decrease CRF in patients during and after chemotherapy and the positive effect of exercise will not change depending to the type of exercise done, which stresses the importance of encouraging patients to be active (Puetz and Herring, 2014).

Physical exercise intervention alone cannot probably improve cancer related fatigue but a multidisciplinary approach will need factors such as balanced diet status or a good psychosocial support in terms of reduction of cancer-related fatigue (Kummer *et al.*, 2013).

A study conducted by the NCCN reported that CRF is the most important symptom that impairs the quality of life and daily patients physical activities (Rayan, *et al.*, 2007), whereby 70% to 100% of patients with cancer experience CRF and most patients with cancer suffer from CRF while receiving chemotherapy, radiation, or bone marrow transplant (NCCN, 2012).

Effective management of CRF requires an informed and supportive oncology care team that assesses fatigue levels regularly, counsels and educates patients regarding strategies for coping with fatigue, and who are able to refer the patient to institutional experts when fatigue is unresolved (Bruera, Yennurajalingam and Cancer, 2017).

2.3. CRITICAL REVIEW AND RESEARCH GAP IDENTIFICATION

Through the review of literature, the research gaps and limitations were specified in the studies of the Past. There is limited literature about fatigue and physical activity among patients receiving chemotherapy, how to assess fatigue and physical activity and the association between fatigue and physical activity among cancer patients receiving chemotherapy. Some literature found is specific to developed countries, and some African countries such as South Africa and Uganda but there is a limited literature about cancer related fatigue and physical activities among patients receiving chemotherapy assessment,

and management in the rest of African countries specifically in East African countries where Rwanda is located.

The WHO stated that CRF negatively affect the daily living activities and occupational performance of participants in instrumental activities and also had difficulty with engaging in leisure activities(WHO, 2013).To better take care of cancer related fatigue, health care providers need to be informed of appropriate assessment and treatment strategies (WHO, 2013).

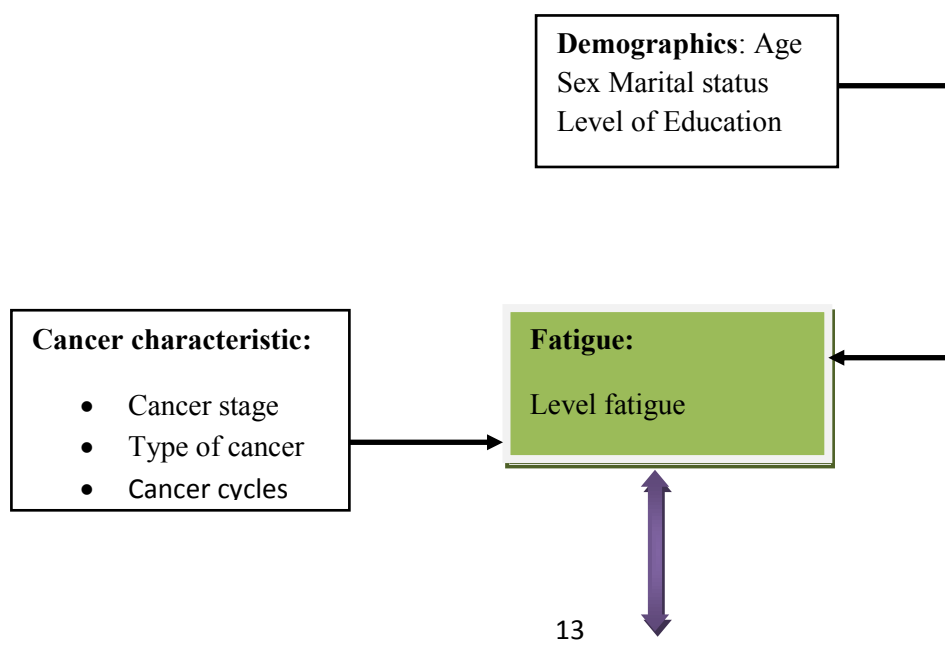
2.5. CONCEPTUAL FRAMEWORK

This study used the goal attainment model to explain the interrelationship between variables under this study. When the patient is not able to take care of him or herself, she/he has fundamental needs such as the need for health information, the need for care that seeks to prevent illness. Health also involves life experiences of the patient that help to adjust the stressors from internal and external environment by using available resources.

King’s theory of goal attainment is applicable to cancer related fatigue and physical activity, because the goals will be achieved when the nurse and patient are both engaged in setting goals,(Beverly j whelton, 2017).

The ultimate goal is to ensure that patients with cancer who are receiving chemotherapy are treated with a maximum of care by considering both independent as well as dependent variables as described below:

CONCEPTUAL FRAMEWORK



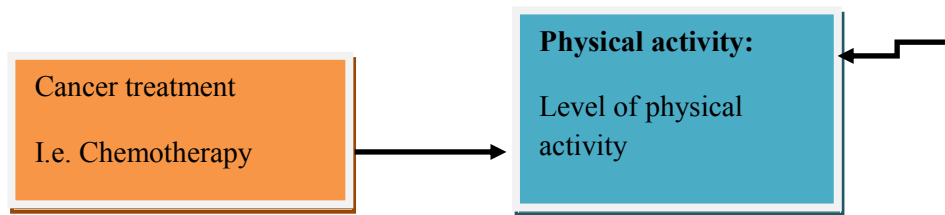


Figure 1: Conceptual framework adapted from Imogen King(BEVERLY J WHELTON, 2017).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

This chapter explains the process and methods which were used to conduct this study. This includes a study area, study population, study design, sample size and sampling methods, data collection methods and procedures, data analysis, study limitation and problems, time frame, budget and ethical consideration

3.2. Research design

A cross sectional non experimental design with a quantitative descriptive approach was used to collect data from participants. A quantitative method was chosen because it enabled the researcher to collect numerical data and perform quantitative analysis using statistical procedures, in order to determine the level of fatigue, level of physical activity and the association between fatigue and physical activity among adult cancer patients receiving chemotherapy(Tranter, 2013). A cross-sectional design was used because it enabled the researcher to systematically determine and report the level of fatigue, level of physical activity and their association at that one moment of time during the period of the research(Alexander *et al.*, 2015).

3.3. Research approach

Quantitative approach was used to meet the objectives of the study

3.4. Research setting

This study was conducted at Butaro Cancer Center of Excellence, a district hospital located in Butaro Sector of Burera District in the Northern Province of Rwanda. The construction of this 150 beds hospital began in December 2008 and was inaugurated in January 2011. This hospital serves a population of more than 400,000 people. It was as founded on 18th July by

the Ministry of Health, with the support from Partners in Health and Dana Farber Cancer Institute. The Butaro Cancer Center of Excellence serves as the first national cancer referral facility in Rwanda. It serves Rwanda and as well as neighboring countries, such as Burundi, the Democratic Republic of Congo (DRC) and Uganda.

3.5. Population

The study population of interest in this study includes adult cancer patients receiving chemotherapy at Butaro Cancer Center of Excellence. The center receives around 200 patients to receive chemotherapy per month and the data collection was conducted in two months from April to May 2019.

3.6. Sampling

3.6.1. Sample size

The selection of study participants was based on considerations of the nature of patients attending the clinic where some of the patients had been attending over time and would only attend occasionally, with others on predictable visits. Other considerations were the need to ensure that only those who meet the study criteria are included. For example only adult cancer patients receiving chemotherapy were included in the study

The center administers chemotherapy for around 200 patients per month and the data collection was conducted from two months.

The sample size for this study was obtained using formula by Taro Yamane 1967. Using that formula therefore, a sample of 154 study participants was selected from the total population. However, one did not respond to the survey questionnaire.

Formula:

$$n = \frac{N}{1 + *(0.05)^2}$$

3.6.2. Sampling strategy

Sampling is basically a process by which the researcher chooses a fraction of the target population, as the representative study population. Working with samples rather than with large populations offers a more cost effective and practical strategy to tackle research (Polit and Beck, 2010). This study used a systematic sampling strategy in order to gain samples of patients who participated in this study. Following the daily list of patients receiving chemotherapy the student researcher interviewed one patient and skipped to the third patient and so on.

3.6.2.1. Inclusion criteria

All adult cancer patients receiving chemotherapy at Butaro Cancer Center of Excellence who were diagnosed with cancer and who wanted to participate in the study through informed consent, provided the required information during the period of data analysis for this study.

3.6.2.2. Exclusion criteria

The following patients were not considered in the study: cancer patients receiving chemotherapy who did not want to participate in the study, patients with mental disorders, patients who are enabled to give consent form, patients aged less than 18 years old and patients who were unable to speak, and those who were deemed by treating clinicians to be “too ill” or had “altered cognition”.

3.7. Validity and reliability of the tool

3.7.1. Validity

The tools of this study were adapted by the researcher based on literature. To assess validity and reliability of the checklist, face validity and reliability methods was used. Face validity is a subjective judgment of whether measures of certain construct “appear” to measure what they intend to measure. This is usually done by showing the measurement to experts and gets their feedback on whether these measures are relevant in measuring what the researcher intends to measure. The tool has been used by different researchers who have proven its validity.

3.7.2 Reliability

Reliability of a research instrument refers to its ability to generate the same results when used under the same conditions. In quantitative research, reliability basically focuses on consistency and stability (Polit and Beck 2010). The test-retest method test was performed on a small population of 16 patients (Polit and Beck, 2010). Cronbach’s alpha test was measured where the results was 0.9 for Fatigue Symptoms Inventory and 0.6 for International Physical Activity questionnaire.

3.8. Data Collection

3.8.1. Data Collection instruments

Two different tools were used in order to get appropriate information. The Fatigue Symptom Inventory(Shahid *et al.*, 2012), and the International Physical Activity Questionnaire(Activity, 2005).The fatigue symptom inventory is composed of 14 items and

is designed to evaluate multiple aspects of fatigue, including its perceived severity, frequency, and interference with daily functioning. The fatigue symptom inventory items use a 10 points, Likert scale that ranges from one fatigue-related extreme to another (lower points on the scale denote less acute problems with fatigue). A global score can be obtained for items 1–13. Question 14 is meant to provide qualitative data only. The international Physical Activity questionnaire is formed by 7 independent questions which rate the level at which a participant had performed the activities.

The specific types of activity that are assessed are walking, moderate-intensity activities and vigorous-intensity activities.

Due to the limited time and financial constraints, the student researcher collected the data herself from patients with completing questionnaire, using FSI and IPA questionnaires. The author confirmed the reliability of the tool through inter-raters reliability. The student researcher administered the checklist to participants and the pilot study was conducted to 16 patients to ensure its validity (Johnson and Brooks 2010).

3.8.2. Data collection procedure

After research approval from the College of Medicine and Health Sciences (CMHS), the student researcher contacted Butaro Cancer Center of Excellence administration by written letter to request permission to conduct the study in their institution. After the request was approved, the student researcher introduced herself to the oncology clinic staff, patients with cancer and gave an explanation about the study. During this process, the benefits for both the staff and patients were described; the process of data collection and the objectives of the study were also communicated. The student researcher administered the checklist to study participants that are the patients undergoing chemotherapy at Butaro Cancer Center of Excellence, signed the consent form. Data were collected during a two months period of time by the student researcher.

3.9. Data analysis

Data were entered in SPSS 21 and the analysis was done by generating descriptive statistics (frequency and percentages) and inferential statistics. Chi-square was used to determine the association between fatigue and physical activities, and correlation coefficient. The results were presented in tables and graphs.

3.10. Ethical considerations

Before conducting the study student researcher requested a written permission from CMHS Institutional Review Board and the authorization to conduct the research at Butaro Cancer of Excellence. The researcher guaranteed the respondents that the participation in the study was voluntary. For the purpose of confidentiality and anonymity, no names were mentioned to the questionnaires.

The student researcher reassured all participants that the information provided was to be used only for the purpose of the study. All study participants signed consent forms which allowed the researcher to conduct the study. Participants were instructed that they might withdraw at any stage of the study without any consequences. The student researcher informed all participants that there was no harm expected to them due to their participation in this study and that no immediate benefits including money and other gift were expected. However, expected scientific benefits that could derive from policy change and improvement of health care service delivery in the area of oncology for both nurses and patients were explained.

3.11. Data management

All data were collected, quantified and coded, entered into the SPSS 21 software, cleaned, analyzed, stored on external disk. The computer which kept the data was locked by the researcher.

3.12. Data Dissemination

The results of this study should be published in order to be accessible to the users in need and the researcher provided feedback to the study setting in order to facilitate them to set strategies to reduce or prevent cancer related fatigue among cancer patients receiving chemotherapy. All study participants should get feedback from this study according to their willing.

3.13. Limitations and challenges

Getting the permission of the author who developed the questionnaire was a big challenge. Worry of missing study participants which may affect the study sample. The student researcher was the one who collected the data, completed the questionnaires due to time and financial constraint. This study did not collect data on the burden of preferences for physical activity or exercise among the participants. The sample size used in this study could not reflect the reality of the whole country and as for that a larger study is advised.

3.14. Conclusion of chapter three

This chapter taking into consideration the study design, the population and sample, it was expected that data collection instrument were are organized in a way that helped the researcher to study and measure what was supposed to be measured and which was supposed to answer the research questions.

CHAPTER4. RESULTS

4.0. INTRODUCTION

This chapter presents the results of the study in relation with the research objectives. It starts with presentation of socio-demographic data followed by level of fatigue among the participants. Physical activity level among patients with cancer receiving chemotherapy is also reported. The relationship between the level of fatigue and physical activity as well as some relevant socio-demographic data is reported.

4.1. The study response rate.

151 out of 154 selected individuals participated in the study, which makes 98% of the response rate. The 2 percent represents those who were not willing to participate in the.

4.2. Socio-demographic variables

The results in table one summarize the demographic data whereby female (66%) outweighed male respondents (32%). Most of the participants were found to be married (67%). The majority of the study participants had primary education (60%) as the highest level of education, and only 4% of respondents had a University level. The age range mostly represented is between 46-55 years old.

Table 1 : Demographic characteristics of respondents

| Variables | | N | % |
|------------------------|-------------------|----------|----------|
| Gender | Male | 50 | 33 |
| | Female | 101 | 66 |
| | Non response | 2 | 1 |
| Total | | 153 | 100 |
| Marital status | Married | 102 | 67 |
| | Divorced | 3 | 2 |
| | Single | 18 | 12 |
| | Widow/ Widower | 29 | 19 |
| | Separated | 1 | 1 |
| | Total | 153 | 100 |
| Education level of the | Primary education | 92 | 60 |

| | | | |
|---------------|--------------|-----|-----|
| participation | | | |
| | Secondary | 35 | 23 |
| | University | 6 | 4 |
| | No education | 16 | 10 |
| | Non response | 4 | 3 |
| Total | | 153 | 100 |
| <hr/> | | | |
| Age | ≥25 | 13 | 8 |
| | 26-35 | 23 | 15 |
| | 36-45 | 33 | 22 |
| | 46-55 | 36 | 24 |
| | 56-65 | 34 | 22 |
| | 66-75 | 12 | 8 |
| | Above 75 | 2 | 1 |
| | Total | 153 | 100 |

The results in table 2 indicate that the majority of the participants have different forms of employments (91%). Where only 9% do not have any form of employment.

Table 2 : Participants' occupation

| Variables | N | % |
|------------------|----------|----------|
| Employed | 139 | 91 |
| Unemployed | 14 | 9 |
| Total | 153 | 100 |

4.3. Cancer characteristics

The results for cancer characteristics were also investigated into and were reported. The types of cancer are reported in table 3 whereby the majority of the participants had breast cancer at with the percentage of 38%.

Table 3 : Types of cancer

| Variables | N | % |
|-------------------------------------|----------|----------|
| Acute Lymphoblastic Leukemia | 4 | 3 |
| Breast | 58 | 38 |
| Cervical | 6 | 4 |
| Colon | 7 | 5 |
| Colon Rectal | 2 | 1 |
| Ewing Sarcoma | 2 | 1 |
| Gastric | 6 | 4 |
| Gestational Trophoblastic Neoplasia | 9 | 6 |
| Head and neck | 1 | 1 |
| Hodgkin Lymphoma | 9 | 6 |
| Kaposi Sarcoma | 14 | 9 |
| Lung | 1 | 1 |
| Multiple Myeloma | 1 | 1 |
| Non Hodgkin Lymphoma | 7 | 5 |
| Osteosarcoma | 6 | 4 |
| Ovarian | 7 | 5 |
| Penile | 1 | 1 |
| Rectal | 10 | 7 |
| Testicular | 1 | 1 |
| Wilm's Tumor | 1 | 1 |
| Total | 153 | 100 |

In table 4, the cancer stage was reported and it was found out that the majority of the participants had stage III and IV (26%).It can be drawn from the data that cancer stage was documented only in 79 patient files.

Table 4 : Cancer stage

| Variables | | N | % |
|--------------|--------|----|----|
| Cancer stage | I-II | 39 | 25 |
| | III-IV | 40 | 26 |
| | Total | 79 | 52 |

The results on cancer treatment duration in table 5 indicated that the mean treatment cycle for cancer patients among study participants was reported to be 5 cycles and the minimum was 1 cycle while the maximum was 12 cycles

Table 5 : Cancer treatment duration

| Variables | N | Minimum | Maximum | Mean | Std. Deviation |
|-----------------|-----|---------|---------|------|----------------|
| Treatment cycle | 116 | 1 | 12 | 5 | 2 |

4.4. The level of fatigue and interference among adult cancer patients receiving chemotherapy

The level of fatigue was measured by calculating the total score for questions 1-4 on fatigue symptom inventory scale, and the cutoff point of ≥ 3 was used to report on the level of clinically fatigued while the ≤ 3 scores were reported to have reported less than clinical fatigue (least) and the scores between 3 and 6 were considered as moderate clinically fatigue. 6+ was reported to be most clinically fatigued on Fatigue Symptom Inventory(Donovan *et al.*, 2008).

Table 6 : Fatigues scores

| Variables | Main scores out of 40 | N | % | Scores in a reduced model out of 10 | N | % | Level of fatigue |
|----------------|-----------------------|-----|-----|-------------------------------------|-----|-------|-----------------------------------|
| Fatigue scores | .00 | 8 | 5 | .00 | 8 | 5.2 | |
| | 3.00 | 3 | 2 | .75 | 3 | 2.0 | |
| | 4.00 | 44 | 29 | 1.00 | 44 | 28.8 | |
| | 5.00 | 10 | 7 | 1.25 | 10 | 6.5 | Less than clinical Fatigue(least) |
| | 6.00 | 5 | 3 | 1.50 | 5 | 3.3 | |
| | 7.00 | 7 | 5 | 1.75 | 7 | 4.6 | |
| | 8.00 | 17 | 11 | 2.00 | 17 | 11.1 | |
| | 9.00 | 1 | 1 | 2.25 | 1 | .7 | |
| | 11.00 | 2 | 1 | 2.75 | 2 | 1.3 | |
| | 12.00 | 4 | 3 | 3.00 | 4 | 2.6 | |
| | 15.00 | 2 | 1 | 3.75 | 2 | 1.3 | |
| | 16.00 | 3 | 2 | 4.00 | 3 | 2.0 | |
| | 17.00 | 4 | 3 | 4.25 | 4 | 2.6 | Moderate clinical fatigue |
| | 18.00 | 2 | 1 | 4.50 | 2 | 1.3 | |
| | 19.00 | 2 | 1 | 4.75 | 2 | 1.3 | |
| | 20.00 | 9 | 6 | 5.00 | 9 | 5.9 | |
| | 21.00 | 7 | 5 | 5.25 | 7 | 4.6 | |
| | 22.00 | 3 | 2 | 5.50 | 3 | 2.0 | |
| | 23.00 | 4 | 3 | 5.75 | 4 | 2.6 | |
| | 24.00 | 4 | 3 | 6.00 | 4 | 2.6 | |
| | 26.00 | 2 | 1 | 6.50 | 2 | 1.3 | |
| | 28.00 | 1 | 1 | 7.00 | 1 | .7 | |
| | 29.00 | 2 | 1 | 7.25 | 2 | 1.3 | MostClinically fatigue |
| | 30.00 | 1 | 1 | 7.50 | 1 | .7 | |
| | 32.00 | 2 | 1 | 8.00 | 2 | 1.3 | |
| | 34.00 | 2 | 1 | 8.50 | 2 | 1.3 | |
| | 36.00 | 1 | 1 | 9.00 | 1 | .7 | |
| | 38.00 | 1 | 1 | 9.50 | 1 | .7 | |
| Total | | 153 | 100 | Total | 153 | 100.0 | |

4.5 The perceived interference levels

The perceived interference to general activity was measured by the total score for 5 -11 interference questions. As for that, the cutoff point of ≤ 3 was used to report the least interference while moderate interference was reported by the range between 3.01 - 6.00. All scores above 6 were reported as most interference on the Fatigue Symptom Inventory (Donovan *et al.*, 2008).

Table 7 : Perceived interference scores

| Variables | | | | Scores for interference out of 10 | | | Level of interference |
|-----------------------------------|-------|-----|-------|-----------------------------------|-----|-------|-----------------------|
| | N | % | | N | % | | |
| Scores for interference out of 70 | .00 | 11 | 7.2 | 0 | 11 | 7.2 | |
| | 1.00 | 1 | .7 | 0.1 | 1 | .7 | |
| | 5.00 | 1 | .7 | 0.7 | 1 | .7 | |
| | 6.00 | 7 | 4.6 | 0.9 | 7 | 4.6 | |
| | 7.00 | 47 | 30.7 | 1.0 | 47 | 30.7 | |
| | 8.00 | 6 | 3.9 | 1.1 | 6 | 3.9 | |
| | 9.00 | 2 | 1.3 | 1.3 | 2 | 1.3 | |
| | 10.00 | 3 | 2.0 | 1.4 | 3 | 2.0 | Least interference |
| | 11.00 | 3 | 2.0 | 1.6 | 3 | 2.0 | |
| | 13.00 | 4 | 2.6 | 1.9 | 4 | 2.6 | |
| | 14.00 | 10 | 6.5 | 2.0 | 10 | 6.5 | |
| | 17.00 | 1 | .7 | 2.4 | 1 | .7 | |
| | 19.00 | 1 | .7 | 2.7 | 1 | .7 | |
| | 20.00 | 1 | .7 | 2.9 | 1 | .7 | |
| | 21.00 | 2 | 1.3 | 3.0 | 2 | 1.3 | |
| | 23.00 | 2 | 1.3 | 3.3 | 2 | 1.3 | |
| | 24.00 | 4 | 2.6 | 3.4 | 4 | 2.6 | |
| | 25.00 | 1 | .7 | 3.6 | 1 | .7 | |
| | 28.00 | 2 | 1.3 | 4.0 | 2 | 1.3 | |
| | 29.00 | 1 | .7 | 4.1 | 1 | .7 | Moderate interference |
| | 31.00 | 2 | 1.3 | 4.4 | 2 | 1.3 | |
| | 33.00 | 3 | 2.0 | 4.7 | 3 | 2.0 | |
| | 34.00 | 6 | 3.9 | 4.9 | 6 | 3.9 | |
| | 35.00 | 7 | 4.6 | 5.0 | 7 | 4.6 | |
| | 36.00 | 2 | 1.3 | 5.1 | 2 | 1.3 | |
| | 37.00 | 1 | .7 | 5.3 | 1 | .7 | |
| | 38.00 | 3 | 2.0 | 5.4 | 3 | 2.0 | |
| | 39.00 | 2 | 1.3 | 5.6 | 2 | 1.3 | |
| | 40.00 | 2 | 1.3 | 5.7 | 2 | 1.3 | |
| | 41.00 | 1 | .7 | 5.9 | 1 | .7 | |
| | 42.00 | 4 | 2.6 | 6.0 | 4 | 2.6 | |
| | 43.00 | 1 | .7 | 6.1 | 1 | .7 | |
| | 46.00 | 1 | .7 | 6.6 | 1 | .7 | |
| | 47.00 | 1 | .7 | 6.7 | 1 | .7 | Most interference |
| | 48.00 | 1 | .7 | 6.9 | 1 | .7 | |
| | 51.00 | 1 | .7 | 7.3 | 1 | .7 | |
| | 55.00 | 1 | .7 | 7.9 | 1 | .7 | |
| | 56.00 | 1 | .7 | 8.0 | 1 | .7 | |
| | 58.00 | 2 | 1.3 | 8.3 | 2 | 1.3 | |
| | 64.00 | 1 | .7 | 9.1 | 1 | .7 | |
| | Total | 153 | 100.0 | | 153 | 100.0 | |

The results in table 8 indicate that most of the participants were least fatigued (66%) on fatigue symptom scale, those who are most fatigued are only 8 %. When the participants were asked to indicate the extent to which fatigue interfered with general activity, ability to bathe and dress, work activity, ability to concentrate, relations with others, enjoyment of life and mood during the previous week using an 11 point rating scale (0 = no interference and 10 = extreme interference), the majority (67%) responded that they had least interference in performing their general activities.

Table 8 : The level of fatigue and interference to activities of daily living among adult cancer patients receiving chemotherapy

| Variables | | N | % |
|-----------------------|-------------------------------------|-----|-----|
| Level of fatigue | Least fatigue (≤ 3.00) | 101 | 66 |
| | Moderate fatigue (3.01 - 6.00) | 40 | 26 |
| | Most fatigued(6.01+) | 12 | 8 |
| | Total | 153 | 100 |
| Level of interference | Least interference (≤ 3.00) | 102 | 67 |
| | Moderate interference (3.01 - 6.00) | 41 | 27 |
| | Most interference (6.01+) | 10 | 7 |
| | Total | 153 | 100 |

The results in table 9 reported that on average, participants were fatigued at least two days. It is evident that one respondent did not answer the question on days he felt fatigue in the past week.

Table 9 : Days in the past week, participants felt fatigued

| Variables | N | Minimum | Maximum | Mean | Std. Deviation |
|--|----------|----------------|----------------|-------------|-----------------------|
| Days, participants felt fatigue in the past week. | 152 | 0 | 7 | 2 | 2 |

The participants were requested to rate how much of the day on average they felt fatigued in the past week on the scale from 0 to 10, and results showed that on average participants felt fatigued at level 3. None in the day participants felt fatigued at a minimum level while the fatigue was felt at a maximum level of 10.

Table 10 : The rate fatigue was felt by the participants throughout the day

| Variable | N | Minimum | Maximum | Mean |
|---|----------|----------------|----------------|-------------|
| Rate how much of the day, on average, you felt fatigued in the past week: | 153 | 0 | 10 | 3 |

The data on daily patterns of the fatigue in the past week indicated that fatigue was mostly worse in the morning (37%) followed by no fatigue at all was felt again in the afternoon (19%)..

The next question aimed at seeking qualitative information on patient perception of daily pattern of fatigue in the past week.

Indicate which of the following best describes the daily pattern of your fatigue in the past week

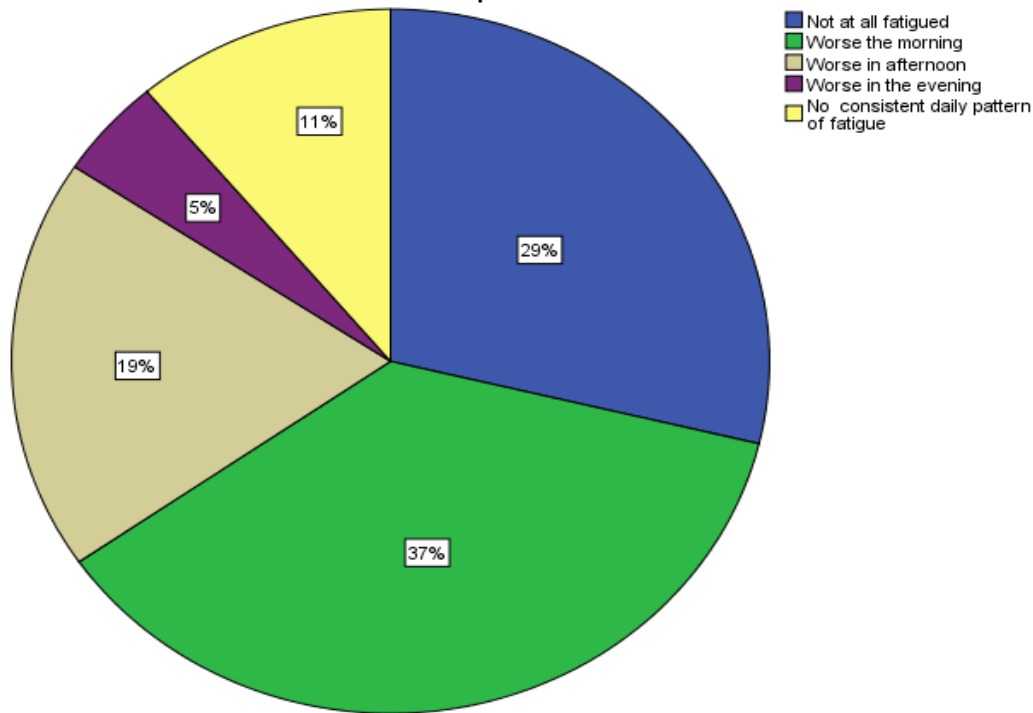


Figure 2 : Daily patterns of fatigue in the past week

4.5. The level of physical activity among cancer patients receiving chemotherapy

This section reports the levels of physical activity which is reported to be classified in three levels by participation in vigorous, moderate and walking as measure of physical activity. Sitting is defined as time spent in sedentary activity, and therefore, it is not reported as median value(Ara, 2005; Forde, 2005). The levels of physical activity are reported in relation with the activity the participants performed at least 10 minutes per day. The total score of each level (Vigorous, moderate and walking) was calculated and the mean score multiplied by the MET (MET represent the amount of energy expended carrying out physical activity) as recommended as true measure of physical activity by the International Physical Activity. While the mean score for vigorous physical activity was multiplied by 8, the mean score for moderate physical activity was multiplied by 4 and the one for walking was multiplied by 3.3. Time spent while sitting does not have any MET.

The results in table 4.11 show that in average participation in vigorous physical activity was at least 1338minutes per week among the participants. It can also be observed that participation in moderate physical activity was 280 minutes per week while participation in walking was 1007.3 minutes per week. On the other hand, inactive participants spent 249.52 minutes seated, in average.

Table 11 : The level of physical activity among cancer patients on chemotherapy

| Variables | N | Minimum | Maximum | Mean | Std. Deviation | Level of Physical activity(Minutes Per week) |
|--|----------|----------------|----------------|-------------|-----------------------|---|
| Participation in vigorous physical activity | 153 | 0.00 | 8820.00 | 167.00 | 809.00 | 1338.00 |
| Physical2: Moderate Physical activity | 153 | 0.00 | 70.00 | 24.00 | 22.00 | 280.00 |
| Physical3: Walking Time spent sitting in one of the days (In minutes): | 153 | 0.00 | 3600.00 | 305.00 | 487.00 | 1007.30 |
| Inactive | 153 | 0.00 | 7200.00 | 249.52 | 625.685 | |

The overall physical activity levels

The overall physical activity showed that in total, participants spent 875.098 minutes physically when they were active and spent 250 minutes physically while inactive.

Table 12 : Overall physical activity (Minute/week)

| Level of physical activity | N | Minimum | Maximum | Mean | Std. Deviation |
|-----------------------------------|----------|----------------|----------------|-------------|-----------------------|
| Active | 153 | 0.00 | 10990.00 | 875.098 | 1080.00 |
| Inactive | 153 | 0.00 | 7200.00 | 250.00 | 626.00 |

4.6. Relationship between fatigue, interference and physical activity among cancer patients undergoing chemotherapy

The present section reports the relationship between fatigue and physical activity. The results in table 13 indicate that there is a strong correlation between the level of fatigue and interference to general activities (P=0.000).

Table 13 : Relationship between level of fatigue and interference with general activities among cancer patients on chemotherapy

| Variables | Level of interference | | | Total | P-Value |
|------------------|-----------------------|-------------|-------|-------|---------|
| | ≤ 3.00 | 3.01 - 6.00 | 6.01+ | | |
| Level of fatigue | ≤3.00 | 99 | 2 | 0 | 0.000 |
| | 3.01-6.00 | 3 | 37 | 0 | |
| | 6.01+ | 0 | 2 | 10 | |
| Total | | 102 | 41 | 10 | 153 |

Results in table14 show that physical activity participation is not correlated with level of fatigue. .

Table 14 : Correlation between level of fatigue, interference and physical activity

| Correlations | | Physical1: Participation in vigorous physical activity | Physical2: Moderate Physical activity | Physical3: Walking | Time spent sitting in one of the days (In minutes): Inactive |
|---------------------------|------------------------|---|--|-----------------------|--|
| Composite Fatigue | Pearson Correlation | -.098 | -.091 | -.127 | .008 |
| | P-Value | .228 | .266 | .116 | .917 |
| | N | 153 | 153 | 153 | 153 |
| Composite Interference | Pearson Correlation | -.090 | -.058 | -.123 | .010 |
| | P-Value | .267 | .473 | .130 | .904 |
| | N | 153 | 153 | 153 | 153 |

Results in table 15 indicate that no demographic variables had an influence on the level of fatigue ($P > 0.05$)

Table 15 : Relationship between socio-demographic variables and level of fatigue

| Variables | | Level of fatigue | | | Total | P-Value |
|--|----------------------|------------------|-------------|-------|-------|---------|
| | | ≤ 3.00 | 3.01 - 6.00 | 6.01+ | | |
| Age | ≤ 25 | 11 | 1 | 1 | 13 | 0.521 |
| | 26-35 | 17 | 6 | 0 | 23 | |
| | 36-45 | 22 | 7 | 4 | 33 | |
| | 46-55 | 22 | 11 | 3 | 36 | |
| | 56-65 | 18 | 12 | 4 | 34 | |
| | 66-75 | 10 | 2 | 0 | 12 | |
| | Above 75 | 1 | 1 | 0 | 2 | |
| Total | | 101 | 40 | 12 | 153 | |
| Gender | Male | 37 | 8 | 5 | 50 | 0.178 |
| | Female | 64 | 30 | 7 | 101 | |
| Total | | 101 | 38 | 12 | 151 | |
| Marital status | Married | 66 | 26 | 10 | 102 | 0.690 |
| | Divorced | 2 | 1 | 0 | 3 | |
| | Single | 14 | 4 | 0 | 18 | |
| | Widow/ Widower | 19 | 8 | 2 | 29 | |
| | Separated | 0 | 1 | 0 | 1 | |
| Total | | 101 | 40 | 12 | 153 | |
| Education level of the participation | No education | 10 | 3 | 3 | 16 | 0.362 |
| | Primary education | 60 | 26 | 6 | 92 | |
| | Secondary | 27 | 7 | 1 | 35 | |
| | University | 3 | 2 | 1 | 6 | |
| Total | | 100 | 38 | 11 | 149 | |
| Occupation | No occupation | 12 | 1 | 0 | 13 | 0.108 |
| | Occupation | 89 | 39 | 12 | 140 | |
| Total | | 101 | 40 | 12 | 153 | |

As it can be observed in table 16, demographic characteristics of respondents were not found to be associated with interference.

Table 16 : Association of socio-demographic variables and level of interference

| Variables | | Level of interference | | | Total | P -value |
|--------------------------------------|-------------------|-----------------------|-------------|-------|-------|----------|
| | | ≤ 3.00 | 3.01 - 6.00 | 6.01+ | | |
| Age | ≤25 | 11 | 1 | 1 | 13 | 0.745 |
| | 26-35 | 17 | 6 | 0 | 23 | |
| | 36-45 | 21 | 9 | 3 | 33 | |
| | 46-55 | 24 | 10 | 2 | 36 | |
| | 56-65 | 19 | 11 | 4 | 34 | |
| | 66-75 | 9 | 3 | 0 | 12 | |
| | Above 75 | 1 | 1 | 0 | 2 | |
| Total | | 102 | 41 | 10 | 153 | |
| Gender | Male | 37 | 8 | 5 | 50 | 0.103 |
| | Female | 65 | 31 | 5 | 101 | |
| Total | | 102 | 39 | 10 | 151 | |
| Marital status | Married | 68 | 26 | 8 | 102 | 0.731 |
| | Divorced | 2 | 1 | 0 | 3 | |
| | Single | 14 | 4 | 0 | 18 | |
| | Widow/ Widower | 18 | 9 | 2 | 29 | |
| | Separated | 0 | 1 | 0 | 1 | |
| Total | | 102 | 41 | 10 | 153 | |
| Education level of the participation | No education | 10 | 3 | 3 | 16 | 0.149 |
| | Primary education | 61 | 27 | 4 | 92 | |
| | Secondary | 28 | 6 | 1 | 35 | |
| | University | 3 | 2 | 1 | 6 | |
| Total | | 102 | 38 | 9 | 149 | |
| Occupation | No occupation | 12 | 1 | 0 | 13 | 0.119 |
| | Occupation | 90 | 40 | 10 | 140 | |
| Total | | 102 | 41 | 10 | 153 | |

Correlation between occupation and physical activity

The results on correlation reported It was found out that that participants with no occupation were likely to be physically inactive in vigorous physical activities ($R^2=.579$, $P= 0. 000$) in comparison with patients with occupations

Table 17 : Correlation between occupation and physical activity

| Correlation | | Occupation | Physical1: Participation in vigorous physical activity | Physical2: Moderate Physical activity | Physical3: Walking | Time spent sitting in one of the days (In minutes): Inactive |
|-------------|------------------------|------------|--|--|-----------------------|---|
| Occupation | Pearson Correlation | 1 | -.579** | -.198* | -.259** | .070 |
| | P-value | | .000 | .014 | .001 | .390 |
| | N | 153 | 153 | 153 | 153 | 153 |

CHAPTER 5. DISCUSSION OF FINDINGS

5.1 Introduction

This chapter discusses the findings of the study in terms to the research objectives; demographic data, level of fatigue among participants and physical activity level among cancer patients receiving chemotherapy in relation with other studies which were conducted in this area, especially to examine the phenomenon of physical activity among patients with cancer. .

5.2 Level of fatigue among adult cancer patients receiving chemotherapy

This study showed that the majority of respondents reported to be least fatigued (66%) on the fatigue symptom inventory. These results are not in tandem with available literature on the same phenomenon. For example, a study published by the American Cancer Journal on the screening, evaluation, and management of cancer related fatigue reported that patients with cancer on chemotherapy tend to have cancer related fatigue where a range between 70% to 80% were reported to have cancer related fatigue(Bower, 2014; Berger *et al.*, 2015).In addition, the findings of this study are not in line with the ones of the study conducted in Nepal on fatigue experience and coping strategies among cancer patients receiving chemotherapy which, which reported that 88.5% of participants had clinically fatigue and 17.5% were found to be with no fatigue, that is less than the cutoff of ≤ 3 (Dahal and Mehta, 2018).A study conducted in Uganda showed that the fatigue is the negative side effect experienced by patients receiving chemotherapy, described in the theme ‘experiences related to the body’ (Wampaalu et al., 2016).A study conducted in South Africa reported that cancer-related fatigue (CRF) remains a major concern for both the patient and health professional, and that approximately 70%-100% of patients with cancer experienced fatigue(Bhyat *et al.*, 2014).

The current study can be in line with the study on cancer and treatment-related fatigue which was conducted in the United States of America and which showed that patients with cancer tend to under report the high level of fatigue because they fear that the treatment can be reduced or under the fear of being called complainer(Wang and Jeanie F. Woodruff, BS, 2015). The study also shows that patients often accept fatigue as the price to be paid for achieving a cure as long as effective fatigue interventions are lacking. The findings of the current study are also similar to the results of the study conducted in the United States with

359 cancer patients undergoing chemotherapy and radiotherapy, where the prevalence of cancer-related fatigue was around 40%(Gomes Canário *et al.*, 2016). From their observations, the authors found that early diagnosis of fatigue could ensure good treatment and boost QOL for these patients.

5.3The level of physical activity among cancer patients on chemotherapy

The findings of the study showed that in average participation in vigorous physical activity was at least 1338 minutes per week among the participants. It was also found out that participation in moderate physical activity was 280 minutes per week while participation in walking was 1007.3 minutes per week. The recommended time to spend in vigorous physical activity is at least 3 days achieving a minimum of 1500MET or 7 or more days of any combination of walking, moderate intensity activity achieving a minimum total physical activity of at least 3000 MET minutes a week (Forde, 2005). The reported level on vigorous physical activity is not far from the recommended figure in literature. The moderate physical activity is close to a recommended time to perform moderate physical activity, which is 30minutes per day

Walking was rated at the second level after vigorous physical activity, and reflects the fact that our study sample was much involved in both vigorous and walking physical activities. On the other hand, inactive participants spent 249.52 minutes seated, in average. The results show that participants in this study were physically active and participation in physical activity was recommended to be a non-pharmacological treatment for cancer related symptoms. African health society has suggested that regular and sustained participation in physical activity protects against cancers of some sites (Heydarnejad *et al.*, 2017 and Hassanpour Dehkordi *et al.*,2017). Therefore, recommending physical activity in the studied population is encouraged.

5.4. Level of interference to physical and activities of daily living among adult cancer patients receiving chemotherapy.

The results of the study showed that the majority of respondents reported least interference in general activities (67%) and most interference (7%). The results are not in line with to the study conducted by oncology nursing society which highlighted that chemotherapy alone is a predictor of activity interference in patients with cancer(Given *et al.*, 2007).

A critical review of existing literature on the effectiveness of implementation strategies to increase physical activity uptake during and after cancer treatmentreported that when interference increases due to chemotherapy, moderate to high intensity physical activity when

performed at 150 minutes of moderate intensity aerobic activity each week consistently are recommended (Bower, Sciences and Cancer, 2015).

A study done by the National Comprehensive Cancer Network on “Evaluation and Management of Fatigue in Oncology” reported that CRF is a persistent and subjective symptom of tiredness related to cancer disease or to its treatment that most of time interferes with general activities. (Hilarius, Kloeg, van der Wall, Komen, Gundy, & Aaronson, 2011).

The present study results can be used as tool to improve on how patients with cancer can be supported to perform general activities without interference.

5.5 Socio-demographic variables and level of fatigue and physical activity

This study shaded light on cancer treatment and socio-demographic variables of the participants namely education, gender, and marital status. The results did not show any link between the mentioned demographic data in relation to level of fatigue, interference with activities and level of physical activities of patients with cancer on chemotherapy except marital status which reported to have a relationship with the mentioned variables ($P < 0.05$). The present study is in conformity with the study conducted in breast cancer patients which reported that socio demographic characteristics did not have any impact on cancer treatment, though only marital status was mentioned to be associated with cancer treatment in breast cancer patients during the study conducted on awareness and current knowledge on breast cancer (Khanna et al., 2017). The existing evidence shows that there is an association between selected demographics of age and physical activity, where active women were reported to have lower depressive symptoms, less anxiety, higher self-esteem, and better global health and quality of life in cancer (Patsouet *al.*, 2018).

5.6 Relationship between the level of fatigue, interference, and physical activity

The results of the study showed that the level of fatigue was associated with interference with general activity ($P = 0.000$), and vice versa. This is an indication that participation in physical activities reduces the level of interference with general activities among cancer patients. The level of physical activity was not found to be associated with neither fatigue nor interference. In addition, socio-demographic variables were reported not to be associated with any variable related to fatigue. The reported figures are also contrary to the evidence that physical activity appears to positively influence fatigue (Canárioet *al.*, 2016).

5.6.1 Limitations

The study sample was taken from a single setting though the sample size and did not reflect the results for all population. A larger sample and analyses including other areas, participants, and time points would have the potential to identify additional relationships.

The instruments used to measure physical activity using a questionnaire may be subject to a high level of recall bias for quantifying movement related to daily activities.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This section reports on general conclusion and recommendations of the present study in relation to its objective to study on fatigue and physical activities among patients on chemotherapy.

6.2 Conclusion

The majority of respondents in this study reported to suffer from breast cancer, and the majority of the participants were least fatigued on fatigue scale (66%); the majority of the participants reported to have interfered with general activity at 67 %. The results reported that socio-demographic data are not related to neither level of fatigue nor interference with general activities. Cancer related symptoms need to be deeply examined with larger sample size and analyses including other areas, participants, and time points for the potential to identify additional relationships. For instance, fatigue is a major symptom among patients with cancer receiving chemotherapy as reported this study.

6.3. Recommendations

Patients

Perform daily physical activities as recommended due to its importance on the management of cancer related symptoms and encourage them to report their daily fatigue to the health care providers.

Family

Family members of cancer patients on chemotherapy should be educated and supported to maintain their beloved family member to stay physically active as one preventive measure for cancer related fatigue development.

Health facilities

They are recommended to assess, identify and measure fatigue related to cancer and manage it properly, educate the patients and their families on the importance of physical activity before, during and after cancer treatment.

To Ministry of Health

To design sensitization campaign on physical activity targeting population at high risk to develop cancer and reduce cancer related fatigue to those who are already affected.

The ministry should also include physical activity prescription in the package of care provided to patients receiving chemotherapy.

Future research

Further research should focus on objective measurement of physical activity by use of longitudinal study. Factors associated with the reported levels need to be studied so as make comparisons with other studies conducted in other settings.

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APPENDICES

3. Rate your level of fatigue on the average during the past week:

0 1 2 3 4 5 6 7 8 9 10
Not at all As fatigued
fatigued as I could be

4. Rate your level of fatigue right now:

0 1 2 3 4 5 6 7 8 9 10
Not at all As fatigued
fatigued as I could be

5. Rate how much, in the past week, fatigue interfered with your general level of activity:

0 1 2 3 4 5 6 7 8 9 10
No Extreme
interference interference

6. Rate how much, in the past week, fatigue interfered with your ability to bathe and dress yourself:

0 1 2 3 4 5 6 7 8 9 10
No Extreme
interference interference

7. Rate how much, in the past week, fatigue interfered with your normal work activity (includes both work outside the home and housework):

0 1 2 3 4 5 6 7 8 9 10
No Extreme
interference interference

8. Rate how much, in the past week, fatigue interfered with your **ability to concentrate**:

0 1 2 3 4 5 6 7 8 9 10
No **Extrem**
interference **e**
interference

9. Rate how much, in the past week, fatigue interfered with your **relations with other people**:

0 1 2 3 4 5 6 7 8 9 10
No **Extrem**
interference **e**
interference

10. Rate how much, in the past week, fatigue interfered with your **enjoyment of life**:

0 1 2 3 4 5 6 7 8 9 10
No **Extrem**
interference **e**
interference

11. Rate how much, in the past week, fatigue interfered with your **mood**:

0 1 2 3 4 5 6 7 8 9 10
No **Extrem**
interference **e**
interference

12. Indicate **how many days**, in the past week, you felt fatigued for any part of the day:

0 1 2 3 4 5 6 7
Day **Day**
s **s**

13. Rate **how much of the day**, on average, you felt fatigued in the past week:

| | | | | | | | | | | |
|----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------------|
| <i>0</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> | <i>6</i> | <i>7</i> | <i>8</i> | <i>9</i> | <i>10</i> |
| None of | | | | | | | | | | The entire |
| The day | | | | | | | | | | day |

14. Indicate which of the following best describes the **daily pattern** of your fatigue in the past week:

| | | | | |
|-------------------|-----------------|------------------|-----------------|----------------------------|
| <i>0</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> |
| Not at all | Worse in | Worse in | Worse in | No consistent daily |
| fatigued | the | the | the | pattern of fatigue |
| | morning | afternoon | evening | |

Ibibazo by'ubushakashatsi mu kinyarwanda

Ubushakashatsi

N^o:.....

Isaha:.....

Itariki: ../.../..

Ibitaro:

IGIKA A: Umwirondoro

Imyaka:

Igitsina:

Irangamimerere:

Idini:.....

Amashuri yize:

Umurimo akora:

IGIKA B: Igipimo cy'umunaniro

1. Ereka igipimo cyumunaniro mwinshi wagize mucyumweru gishize:

0 1 2 3 4 5 6 7 8 9 10

Sinananiwe

narananiwe bikabije

2. Ereka igipimo cyumunaniro muke wagize mucyumweru gishize:

0 1 2 3 4 5 6 7 8 9 10

Sinananiwe

narananiwe bikabije

3. Ereka igipimo cyumunaniro uringaniye wagize mucyumweru gishize:

0 1 2 3 4 5 6 7 8 9 10

Sinananiwe

narananiwe bikabije

4. Erekan igipimo cyumunaniro ufite nonaha:

0 1 2 3 4 5 6 7 8 9 10

Sinaniwe

ndaniwe bikabije

5. Erekan igipimo ,umunaniro wabangamiye imirimo yawe yaburi muni mucyumweru gishize

0 1 2 3 4 5 6 7 8 9 10

Ntakibazo

bikabije cyane

6. Erekan igipimo ,umunaniro wabangamiye ubushobozi bwawe bwo kwiyozza mucyumweru gishize

0 1 2 3 4 5 6 7 8 9 10

Sinananiwe

narananiwe bikabije

7. Erekan igipimo ,umunaniro wabangamiye imirimo yawe isanzwe, mucyumweru gishize

0 1 2 3 4 5 6 7 8 9 10

Ntakibazo

Sinabishoboraga

8. Erekan igipimo ,umunaniro wakubangamiye mumitekerereze mucyumweru gishize

0 1 2 3 4 5 6 7 8 9 10

Ntakibazo

Sinabishoboraga

9. Erekan igipimo ,umunaniro wakubangamiye mumibanire yawe nabandi mucyumweru gishize

0 1 2 3 4 5 6 7 8 9 10

Ntakibazo

Sinabishoboraga

10. Erekan igipimo ,umunaniro wabangamiye kwishimisha mubuzima, mucyumweru gishize

0 1 2 3 4 5 6 7 8 9 10

Ntakibazo

Sinabishoboraga

11. Erekan igipimo ,umunaniro wabangamiye imitekerereze yawe mucyumweru gishize

0 1 2 3 4 5 6 7 8 9 10

Ntakibazo

Sinabishoboraga

12. Erekena niminsi ingahe ,mucyumweru gishize wananiwe,mugice icyaricyo cyose cy'umunsi:

| | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|
| <i>0</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> | <i>6</i> | <i>7</i> |
| Imin | | | | | | Imi | |
| si | | | | | | nsi | |

13. Erekena niryari mugihe cy'umunsi,wumvise unaniwe mucyumweru gishize:

| | | | | | | | | | | |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------|
| <i>0</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> | <i>6</i> | <i>7</i> | <i>8</i> | <i>9</i> | <i>10</i> |
| Ntanarimwe | | | | | | | | | | umunsi wose |

14.Erekana niryari umunaniro wiyongereye mugihe cyumunsi,mucyumweru gishize:

| | | | | |
|-------------|-----------|--------------|------------|-------------|
| <i>0</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> |
| Ntamunaniro | Wiyongera | Wiyongera | Wiyongera | Igihe cyose |
| | mugitondo | nyuma yasita | nimugoroba | |

SECTION B: Describe the level of physical activity among cancer patients receiving chemotherapy

(INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE)

FOR USE WITH YOUNG AND MIDDLE-AGED ADULTS (15-69 years)

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ **Days per week**

No vigorous physical activities → *Skip to question 3*

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ **days per week**

- No moderate physical activities → *Skip to question 5*
4. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

- No walking → *Skip to question 7*

5. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

- Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

6. During the **last 7 days**, how much time did you spend **sitting** on a **weekday**?

_____ **hours per day**

_____ **minutes per day**

- Don't know/Not sure

This is the end of the questionnaire, thank you for participating.

Request the permission to use the tool(FSI)

Boîte de réception x



marie claire nyinawase <uwaclear1@gmail.com> mer. 10 avr. 07:55

À jacobsen

Dear,

I am Marie Claire Nyinawase a student in Oncology Nursing masters program at the University of RWANDA College of Medicine and health sciences, School of Nursing and Midwives.

I am pleased to write the email to you in order to request the permission to use the tool you developed called FATIGUE SYMPTOMS INVENTORY.

my study is " FATIGUE AND PHYSICAL ACTIVITY AMONG CANCER PATIENTS RECEIVING CHEMOTHERAPY"

Thanks and I am looking forward to hearing from you.

Kigali, 14/01/2019
Ref: CMHS/IRB/039/2019

NYINAWASE Marie Claire
School of Nursing and Midwifery, CMHS, UR

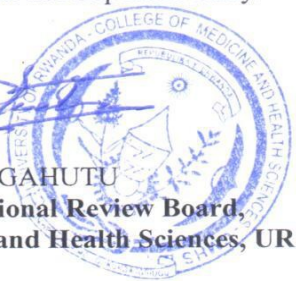

Dear NYINAWASE Marie Claire

RE: ETHICAL CLEARANCE

Reference is made to your application for ethical clearance for the study entitled "*Fatigue and Physical Activity among Adults Patients Receiving Chemotherapy in Rwanda*".

Having reviewed your protocol and found it satisfying the ethical requirements, your study is hereby granted ethical clearance. The ethical clearance is valid for one year starting from the date it is issued and shall be renewed on request. You will be required to submit the progress report and any major changes made in the proposal during the implementation stage. In addition, at the end, the IRB shall need to be given the final report of your study.

We wish you success in this important study.



Professor Jean Bosco GAHUTU
Chairperson Institutional Review Board
College of Medicine and Health Sciences, UR

Cc:

- Principal College of Medicine and Health Sciences, UR
- University Director of Research and Postgraduate studies, UR

REPUBLIC OF RWANDA
NORTHERN PROVINCE
BURERA DISTRICT
BUTARO HOSPITAL
E-mail: butaro.hospital@moh.gov.rw

Butaro, February 11, 2019

Our Ref...../HB/MT/QI /2019

066

NYINAWASE Marie Claire

School of Nursing and Midwifery, CMHS, UR

Re: Acceptance Letter

Dear Madam,

Butaro Hospital Leadership is pleased to inform you that your request for collecting data of your study entitled” *Fatigue and Physical Activity among Adult Cancer Patients Receiving Chemotherapy in Rwanda*” at Butaro Hospital has been accepted.

We take this opportunity to inform you that during data collection period you will be required to comply with ethical principles applied at Butaro Hospital.

We wish you all the best.

Sincerely,


Dr MPUNGA Tharcisse

Director General/ Butaro Hospital






Certificate of Completion



The National Institutes of Health (NIH) Office of Extramural Research certifies that **Marie claire NYINAWASE** successfully completed the NIH Web-based training course "Protecting Human Research Participants."



Date of Completion: 02/07/2018

Certification Number: 2498041



ANNEX 2 BUDGET OF THE STUDY

1. PREPARATION FOR THE STUDY

| N° | Items | N° of persons | N° of days | N° of person days | Cost / Unit (RWF) | Total RWF |
|-------------------|---|---------------|------------|-------------------|-------------------|----------------|
| 1 | Research preparation and submission | 2 | 10 | 20 | 3,000 | 60,000 |
| 2 | Authorization, and permission for research | 2 | 2 | 4 | 15,000 | 60,000 |
| 3 | Hospital contact to orient members on project | 2 | 2 | 4 | 15,000 | 60,000 |
| 4 | Pre-test and finalization questionnaire | 2 | 2 | 4 | 15,000 | 60,000 |
| Subtotal 1 | | | | | | 240,000 |

2. THE SURVEY

| N° | Tasks to be performed | N° of persons | N° of days | N° of persons days | Unit cost RWF | Total RWF |
|--------------------|-----------------------|---------------|------------|--------------------|---------------|----------------|
| 1 | Data collection | 2 | 3 | 6 | 5,000 | 30,000 |
| 2 | Transport | 2 | 3 | 6 | 10,000 | 60,000 |
| 3 | Restaurant | 2 | 3 | 6 | 2000 | 12,000 |
| Sub-total 2 | | | | | | 102,000 |

3. STUDY SUPPLIES

| N° | Items | Quantity | Unit price | Total |
|----|-----------------------|----------|------------|--------|
| 1 | Papers | 1 Ream | 4,000 | 4,000 |
| 2 | Pens | 6 | 100 | 600 |
| 3 | Pencil | 6 | 50 | 300 |
| 4 | Modem | 1 | 10,000 | 10,000 |
| 5 | Internet subscription | 3months | 21,000 | 63,000 |
| 6 | Calculator | 2 | 1,500 | 3,000 |
| 7 | Rubber eraser | 2 | 100 | 200 |
| 8 | Rulers | 2 | 500 | 1,000 |

| | | | | |
|--------------------|-------------------|-----|---------|----------------|
| 9 | Perforator | 1 | 1,000 | 1,000 |
| 10 | Staple | 1 | 500 | 500 |
| 11 | Stapler | 1 | 1,500 | 1,500 |
| 12 | Paper holder | 2 | 2,000 | 4,000 |
| 13 | Photocopies | 100 | 15 | 1,500 |
| 14 | Printing | 200 | 100 | 20,000 |
| 15 | Airtime | 35 | 1,500 | 52,500 |
| 16 | Flash disk 4GB | 1 | 5,000 | 5,000 |
| 17 | Scotch | 1 | 500 | 500 |
| 18 | Room | 2 | 100,000 | 200,000 |
| 19 | Computer location | 1 | 60,000 | 60,000 |
| Sub-Total 3 | | | | 428,600 |