



**PREVALENCE OF DEPRESSION, ANXIETY AND ASSOCIATED  
FACTORS AMONG PATIENTS WHO HAVE RECOVERED FROM  
COVID-19 INFECTION 6 MONTHS POST DIAGNOSIS AT AVENUE  
HOSPITAL NAIROBI**

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OF THE REQUIREMENTS FOR THE AWARD OF A DEGREE IN  
MASTER OF MEDICINE IN PSYCHIATRY**

**OCTOBER 2023**

## **DECLARATION OF ORIGINALITY**

I declare that this dissertation is my original work conducted in partial fulfillment of my requirements for the award of a degree in Master of Medicine in Psychiatry at the University of Nairobi.

I have not submitted the same to any other university for the award of a degree.



Date: 5-05-2023

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## DEDICATION

I dedicate my dissertation to my family and friends. A special feeling of gratitude towards my wife Dolan Shah

I would like to dedicate this dissertation to all those who have been affected by Covid-19.

## ACKNOWLEDGMENT

I would like to acknowledge and extend my heartfelt gratitude to my supervisors without whose assistance and guidance, this dissertation would not have been possible. Their salient advice carried me through all the stages of writing my dissertation.

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## LIST OF ABBREVIATIONS

DSM5	Diagnostic and Statistical Manual of Mental Disorders version 5
GAD	General Anxiety Disorder
MDD	Major Depressive Disorder
MoH	Ministry of Health
MNTRH	Mathari National Teaching and Referral Hospital
BDI	Beck Depression Inventory
BAI	Beck Anxiety Inventory
SPSS	Statistical Package for Social Scientists
ERC	Ethics Review Committee
WHO	World Health Organization
HCW	Health Care Worker
NHCW	Non-Health Care Worker

## OPERATION DEFINITION

Anxiety – feeling of excessive worry, being on edge, restlessness with difficulty concentrating.

Depression – mood disorder where one feels sad, has low mood and loses interest in things which were previously enjoyed.

## ABSTRACT

### **Background**

Covid-19 has impacted the lives of many Kenyans and has posed a great challenge to mental wellbeing. Little is known about mental health among adults who were infected with the virus. Common mental disorders include depression and anxiety which have a negative impact on the quality of life.

### **Aim**

The primary goal of this research is to determine the prevalence of depression, anxiety and associated sociodemographic factors, among patients who have recovered from Covid-19 infection 6 months post-diagnosis at Avenue Hospital, Nairobi.

### **Methodology**

This is a cross-sectional study conducted at Avenue Hospital, Nairobi after appropriate approvals were received. The study population included any adult who has recovered from Covid-19 infection, 6 months post the diagnosis, given consent, and met the inclusion and exclusion criteria. The study participants were selected using a simple random sampling method. Data was collected using a researcher-designed questionnaire capturing the socio-demographic factors, the Beck Depression Inventory II (BDI-II) for assessing depressive symptoms, Beck Anxiety Inventory (BAI) for assessing anxiety symptoms, and Covid-illness checklist. Collected data was analyzed using SPSS version 26. Univariate analysis was done on the sociodemographic variables and summarized in the form of tables and graphs. Data was summarized into frequency and percentages. The association between depression, anxiety and socio-demographic factors was determined using the Chi-square test. A binary logistic regression model was also used to produce the odds ratio and corresponding Confidence interval and P-values. A p value of  $< 0.05$  was taken to show a statistically significant association.

### **Results**

The prevalence of depression in this study was seen to be at 20% (mild- 10%, moderate- 5%, and severe- 5%). There was a significant association between being female and depression ( $p=0.002$ ). Having an income of less than KES 100,000 had an association with depression ( $p<0.05$ ). A significant association was also noted between depression and having a previous diagnosis of depression ( $p=0.007$ ). The prevalence of anxiety in this study was seen to be at 31% (mild- 19%, moderate- 6%, and severe- 6%). Being female was individually associated with anxiety ( $p=0.003$ ). There was also a significant association between anxiety and having an income of less than KES 100,000 ( $p<0.005$ ). A significant association was seen between anxiety and being a dependent in the family ( $p=0.025$ ). A previous history of having both depression and anxiety was also significantly associated with anxiety ( $p=0.033$ ). A significant correlation between depression and anxiety was evident ( $p<0.001$ ) showing that those who suffered from one of the two (depression or anxiety) also suffered from the other.

## **Conclusion**

Depression and anxiety are prevalent among patients who have recovered from Covid-19 infection 6 months post-diagnosis. Routine screening for depression and anxiety among patients who have recovered from Covid-19 should be implemented to enhance early detection and management.

## CHAPTER ONE: INTRODUCTION AND PROBLEM STATEMENT

### 1.1 INTRODUCTION

The Covid-19 pandemic has affected many people across the world and continues to affect more, with over 650 million cases and nearly 6.6 million deaths to date (World Health Organization, 202 C.E.). The coronavirus causes upper respiratory tract infection and symptoms include many such as fever, body malaise, difficulty in breathing, loss of taste among others. The first case in Kenya was confirmed on 12<sup>th</sup> March 2020, since the beginning of the outbreak in China in December 2019, and one day after the WHO declared it as a pandemic. Some of the measures taken to combat the pandemic in Kenya were social distancing, suspension of gatherings, mandatory mask wearing, and curfews being put in place among others. Despite the measures taken, the coronavirus disease spread fast having a significant impact on lives of many Kenyans. With the increasing number of infections around the world, developing countries have been affected greatly. A meta-analysis done by (Levin et al., 2022)) explains how the burden of Covid-19 is higher in developing countries than in developed countries.

The outbreak of this highly contagious disease came with an unexpected burden on morbidity and mortality across Kenya. A study by ((Adera Gebru et al., 2021)) found that this rate is alarmingly increasing. In regard to the pandemic, the Kenyan government announced various plans and strategies such as quarantine, work from home, school suspensions, travel ban, public mask wearing, social distancing, and suspension of gatherings to mitigate the risk of spread. This caused severe disruption of routines, loss of jobs, salary deductions, and added extra costs to people's livelihood such as buying surgical masks and sanitizers. This led to socioeconomic consequences, such as reduced or zero job productivity and financial hardships.

Without doubt, the Covid-19 outbreak led to significant psychosocial stressors; fear of infection being the most common, caused anxiety and depression among many (Pui et al., n.d.-a). Depression is a mood disorder that is characterized by feelings of sadness and lack of interest, with changes in sleeping and eating patterns, irritability, guilt, fatigue, and suicidal thoughts. For depression to be diagnosed, symptoms should be present for at least 2 weeks. (*DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS FIFTH EDITION TEXT REVISION*, n.d.) Anxiety is the feeling of excess worry, restlessness or being on edge, avoiding a certain situation, lack of concentration, irritability, insomnia, muscle tension that interferes with daily activities, for a minimum duration of 6 months. (*DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS FIFTH EDITION TEXT REVISION*, n.d.)

According to WHO, global prevalence of depression and anxiety increased by 25% during the 1<sup>st</sup> year of the Covid-19 pandemic. Emerging research suggests that depression (14.6%- 48%) and anxiety (6.33%- 50.9%) levels are increasing around the world (Xiong et al., 2020) . This increase is due to higher levels of perceived stress, loneliness, living with someone at high risk and prior mental health symptoms (Gilbar et al., 2022). Income loss for adults during the pandemic caused stress, food insecurity, poor health seeking behaviors, household tension, and onset of depressive symptoms which are indirectly associated with adolescent mental health (Pinchoff et al., 2021). Some demographic characteristics including being female, lower

education levels and having a low-income status put one at risk for depression and anxiety (Xiong et al., 2020). (Pradipta Lusida et al., 2022) reported a relatively low prevalence of depression and anxiety among non-hospitalized, asymptomatic patients and patients mildly infected with Covid-19.

It has also been seen that the prevalence of depression and anxiety has gone up, especially in the vulnerable population. However, a study done in Belgium on cancer patients during the Covid-19 pandemic by (de Jaeghere et al., 2022) found depression (27.6%- 33.5%) and anxiety (24.9%- 32.7%) and were faring better than expected, while a study done in Spain by (Obispo-Portero et al., 2022) found higher levels of depression (35%) and anxiety (36%) among advanced cancer patients initiating treatment during the pandemic.

Psychosocial stressors such as health threats to oneself and loved ones are correlated with the COVID-19 pandemic. There are several interferences in routines such as separation from family members and friends, shortages of daily necessities, social isolation, salary deduction and school closure. The psychosocial reaction to infectious disease outbreaks is multiple and can include feelings of worry, inappropriate and excessive use of precautionary measures such as frequent use of sanitizer especially amongst health care workers and those with obsessive compulsive disorder, wearing of facial masks, social distancing, and an increased need for health care services in a time of deficiency in personnel. On the other hand, some people might deny the risk of infection and fail to consider preventive health behaviors to help reduce or stop the spread of the infection. A healthier and timely understanding of the psychological response to infectious disease outbreak within the community is essential for several reasons. First, the high prevalence of psychological morbidities has been recorded among individuals who are directly exposed to life threatening situations. Second, the development of such psychological morbidities in a considerable proportion of the community can impact the day-to-day functions of the affected individuals and can lead to immediate social and economic consequences, such as lost job productivity and financial hardship. Third, better safeguarding of psychological health of the community through practical mental health intervention is crucial to help prevent or improve healthcare delivery disruption during outbreaks.

Without a doubt, the COVID-19 outbreak was and possibly still is stressful for people and communities. Fear of infection was very common during the outbreak. People were also concerned that the health care system could not cope with the COVID-19 pandemic. There were not enough hospital beds and ventilators to handle the rising number of COVID-19 cases they were projected to receive. Furthermore, people worried that the global economy might become worse. Fear and anxiety about the COVID-19 pandemic can be shattering and lead to strong emotions. Besides, poor mental health during infectious disease outbreaks can be related to an individual's misunderstanding of health-related stimuli such as bodily sensation and changes. People might misinterpret harmless body dispensation or changes as signs of infection, causing them to become unduly distressed.

## 1.2 PROBLEM STATEMENT

Covid-19 impacts lives of patients significantly. Patients undergo many stressors including fear of infecting dear ones, separation from family members during quarantine, disruptions of routines, salary deduction, social isolation, and death of family member(s) due to Covid-19. All the above are considered risk factors for depression and anxiety (Quaife et al., 2020).

Stigma surrounding mental health has always been a challenge in getting help for those with mental illness. Previous research has shown that stigma is influenced by level of education, culture, and age (Balraj K et al., 2018,) (Mburu et al., 2007).

In Kenya, most people believe that mental illness is caused by supernatural forces like evil spirits (bewitchment) and use of excessive intoxicants (legal and illegal), hence seek help from religious leaders rather than mental health professionals (Norris et al., 2016). The doctor to patient ratio is overwhelming in Kenya with less than 500 mental health specialists to a population of over 43 million (Marangu et al., 2014). There is low resource allocation especially in terms of personnel for mental health. Psychiatrists in Kenya are few compared to other disciplines (Ndetei, 2007).

Untreated depression can negatively impact a person's relationship with family, friends, and coworkers. It also leads to sleep disruption, weakened immune system, physical pain, suicidal thoughts, and an overall poor quality of life (Schonfeld et al., 1997). It also increases the chance of risky behaviors such as drug or alcohol addiction leading to diminished quality of life and workplace productivity (Voros et al., 2020), hence early detection of depression improves overall productivity and quality of life as treatment can be started early too.

Untreated anxiety has negative consequences that include reduced ability to work leading to loss of productivity, agitation, and high rate of comorbid depression leading to risk of suicide (van Beljouw et al., 2010). Early detection and treatment have a better outcome and improve quality of life.

With the above studies, Covid-19 has been seen to increase the rate of depression and anxiety across the globe. Local studies have been done showing the prevalence of depression and anxiety, but limited research is available on the follow up for patients who have recovered from Covid-19 infection.

## CHAPTER TWO: LITERATURE REVIEW

This chapter looks at relevant research studies that have been done on the prevalence of depression and anxiety among the general public, healthcare workers, Students, different socio-economic status, those with chronic illnesses, those with loss of family members due to COVID 19 and the impact of COVID-19.

Mental health is recognized as a fundamental and vital component of health by the World Health Organization (WHO). In this context, mental health implies a condition of well-being whereby a person can recognize his own capabilities, deal with everyday struggles, work efficiently and give back to society. An individual's psychological health status can be attributed to combination of multitude of varied interpersonal, cognitive and physiological variables at any one time.

### 2.1 EPIDEMIOLOGY OF DEPRESSION AND ANXIETY

Depression is a common mental illness seen globally affecting 280 million individuals (WHO). It is marked by low moods (feeling of unhappiness) and with lack of involvement in pleasurable activities, together with feeling of guilt, changes in eating and sleeping patterns, low self-esteem, irritability and self-isolation. Lack of early detection of these and depending on the severity this can lead to loss of life. Timely intervention in the early stages of the symptoms have been shown to reduce the complication. Management involves non pharmacotherapy and pharmacotherapy interventions. Risk factor identification is a key factor which helps to prevent complications, for example job loss, financial constraint, physical abuse, stressful life events and drug abuse.

Anxiety is also one of the most common mental illnesses seen globally affecting more than 300 million (WHO). When we encounter a threat, the body produces a natural or warning signal by activating the sympathetic nervous system. It involves excessive amount of worry for a number of events or activities, where the individual finds it difficult to control the worry, feels restless with increased heart rate and blood pressure, feels like is on the edge, easily fatigued with muscle pains and irritability. Individuals experiencing elevated anxiety have been noted to be at a risk of developing cardiovascular condition as well as sudden death due to cardiovascular disease as (Roest et al., 2010) explains it.

Globally (Franz et al., 2022a) did a one-year meta-analysis involving 18 eligible papers with a total of 8591 COVID-19 survivors on follow up on post-Covid symptoms and found depression (23%) and anxiety (22%) by using the Hospital Anxiety and Depression scale (HADS), Hamilton anxiety rating scale and Hamilton depression rating scale. The follow up method included in-person visits and phone interviews. In addition, those with severe illness and the female gender were more likely to be affected. Another meta-analysis done by (Deng et al., 2020a) in Canada



comprised of 31 studies available on online research platforms and found the combined prevalence of depression (45%) and anxiety (47%).

A comprehensive study by (van den Borst et al., 2021) explained the extended health outcome of Covid-19 in patients discharged from The Radboud University Medical Center, Nijmegen, the Netherlands. A sample of 124 patients attended aftercare at their outpatient facility. The outcome of the study showed patients with depression (12%) and anxiety (10%).

A study done by (Zubayer et al., 2020) on the psychological state of people of Bangladesh 4 months after Covid-19 started, was to find out the prevalence of anxiety, depression and stress among the people. They enrolled 1146 participants out of which 47.2% were found to have depression, 46% to have anxiety and 32.5% to have stress.

A study in Hong Kong on depression and anxiety during Covid-19 pandemic by (Pui et al., n.d.-a) found depression (19%) and anxiety (14%). It was further reported that a quarter of the participants had a decline in their mental health since the pandemic started.

(Xiao et al., 2022a) did a study on Covid-19 survivors 6 months after discharge in 5 cities of China- Shenzhen, Wuhan, Nanning, Dongguan and Zhuhai. The authors categorized depressive symptoms as mild, moderate, and severe at 76.9%, 12% and 11.1% respectively. The measures of anxiety symptoms were mild, moderate, and severe at 77.4%, 15.1% and 7.5% respectively. The findings suggested that post-hospitalization and behavioral factors had a positive association with depression and anxiety.

(Gupta et al., 2020a) looked at the psychological health among doctors working in the armed forces during the first couple of months of the Covid-19 pandemic in India. The study sampled 769 respondents and found depression (28.2%) and anxiety (35.2%). The major findings showed that people of young age, females and non-medical specialists were seen to have a higher risk for depression and anxiety.

Nurses remain at the forefront in patient care which is heavily reliant upon their ability to work optimally. (Maharaj et al., 2019) conducted a study in Australia to see the prevalence of depression, anxiety and stress and associated risk factors among nurses. 102 nurses participated in the study, and it was found that depression, anxiety and stress was at 32.4%, 41.2% and 41.2% respectively. In 2009, a study by (Mak et al., 2009) on the long-standing mental health condition among SARS survivors in Hong Kong, 30 months after the outbreak, showed PTSD (25%) and depression (15.6%). The outbreak was regarded as a catastrophe.

## 2.2 SOCIODEMOGRAPHIC DATA AND DEPRESSION AND ANXIETY

A meta-analysis done by (Hossain et al., 2021) looked into the epidemiological burden of depression and anxiety during the COVID-19 pandemic in South Asian region with country level estimates. They systematically identify 35 cross-sectional studies and quantitatively evaluated the pooled prevalence in the collective sample alongside estimating the prevalence rate in the different subgroup and population in this region. The overall prevalence of anxiety and depression was 41.3% and 34.1% respectively. Moreover, women had higher prevalence of both

disorders (anxiety 46.5%, depression 36.7%) compared to men which was at a lower percentage (anxiety 41.1% and depression 36.7%).

A study by (Ahmed et al., 2021) in Egypt looks at the long-term consequences of Covid-19 on mental health, 6 months post infection in which 182 participants were enrolled. The study concluded that 91.2% of the participants had a psychiatric symptom; depression (11.5%) and anxiety (28%). Married women were at a higher risk to have anxiety than single women.

A similar study in Egypt by (Ahmed et al., n.d.) compared mental health disorders of Covid-19, attitude, knowledge and socioeconomic burden between health care workers and the general public. It involved 524 participants; 122 were HCWs, of which 66.4% and 32% had depression and anxiety respectively, and NHCWs were 402, of which 69% and 30% had depression and anxiety respectively. It was further observed that HCWs had better understanding about Covid-19 and were optimistic towards the safety measures, relative to NHCWs.

(Abas et al., 2021a) looked at anxiety levels in Sudanese university students, which included 478 participants. It was categorized in levels of low, moderate, and high anxiety which were at 75%, 15.5% and 9.4% respectively. These figures were attributed to disobeying curfew regulations and the protective measures of covering the nose and mouth while coughing and sneezing. Due to the difficult economic situation of the country and poor access to online learning, it was onerous for the university students to continue with their studies.

(Hajure et al., 2020) did a study among chronically ill medical patients in Ethiopia looking at depression, anxiety and associated factors in Mettu Karl Referral Hospital. 423 participants took part in the study, and it saw depression (55.7%) and anxiety (61.8%). It was further noted that being a single female, early age of onset (<36 years) and having (>6 years) of chronic illness had a positive association with depression. Poor social support and use of tobacco was also significantly related with anxiety symptoms among chronically ill medical patients in Ethiopia during the Covid-19 pandemic.

A study was done in South Africa by (Posel et al., 2021a) on joblessness and mental health during the Covid-19 lockdown. PHQ-2 and CES-D 10 were used, and it was found that those who lost their jobs were at an increased risk of depression than those who retained their jobs. Another study by (Nwosu, 2021) in South Africa looked at childcare and depression during the lockdown. It was found that spending more time looking after children had an increased risk of depression, and this relationship was stronger among men than women.

A study done in the US Comparing Levels of depression before COVID-19 and after COVID-19 infections by (Ettman et al., 2020). It involved a total of 1470 participants, who were selected through probability sampling design by the National Health and Nutritional Examination Survey (NHANES) and we're measuring the physical and mental health of participants through interviews in our mobile examination centers. It was found that depression symptoms were at 8.5% before COVID-19 and 27.8% had depressive symptoms during COVID-19. Higher levels of depression symptoms who are seen in all demographic categories during COVID-19 compared to before, with more than 3-times higher prevalence of depression symptoms in general. It also concluded that having more resources was associated with lower prevalence of

depression symptoms both before and during COVID-19. Married individuals had a lower rate of depressive symptoms compared to those who were widowed, divorced, separated or never married participants. Those with household savings of \$5000 or more were less likely to have depressive symptoms compared to those individuals with savings less than \$5000.

A few studies have been done locally (in Kenya), in the early phase of Covid-19. (Kwobah et al., 2021) did a study titled Mental Disorders Among Health Care Workers at the Early Phase of COVID-19 Pandemic in Kenya. The study involved 1259 health care workers; it saw depression (32.1%) and anxiety (36%). It was further noted that depression and anxiety was higher among females who were not married compared to married females.

A similar study done by (Shah et al., 2021) which involved 433 health care workers across 3 major hospitals in Kenya, reported depression (53.6%) and anxiety (44.3%). It was noted that being a female doctor and working in a government hospital which had inadequate resources increased the risk of mental health symptoms.

(Onchonga et al., 2021) did a study during the Covid-19 pandemic to find the degree of depression and anxiety among 476 HCWs from Jaramogi Oginga Odinga Teaching and Referral Hospital. Depression and anxiety were measured as mild, moderate, moderate-severe and severe whereby depression was at 53.6%, 26.9%, 10.3% and 9.2% and anxiety was at 35.1%, 33.8%, 17.6% and 13.4% respectively.

A study done during initial months when Covid-19 by (Ali et al., 2022) looking at depression and anxiety among postgraduate resident in Kenya. The study was a cross-sectional study that involved 100 participants enrolled in nine different graduate medical education programs at the Aga Khan University Hospital, Nairobi. Depression was reported in 64.3% and anxiety at 51.5%.

A study done by (Caleb et al, 2022) investigated the prevalence of psychological distress, dysfunctional coronavirus anxiety and the impact of the Covid-19 pandemic among caregivers of children with mental illness. The study involved 100 participants and found depression (36%), anxiety (38%), stress (29%) and dysfunctional Covid anxiety (20%). Losing a close tie, whether one was an essential worker or not, to Covid-19, was associated positively with greater depressive symptoms; however, essential workers who lost a close-tie to Covid- 19 showed exacerbated depressive symptoms compared to non-essential workers who lost a close tie to Covid- 19. (Grace, 2021)

### 2.3 DEPRESSION AND ANXIETY: RISK FACTORS

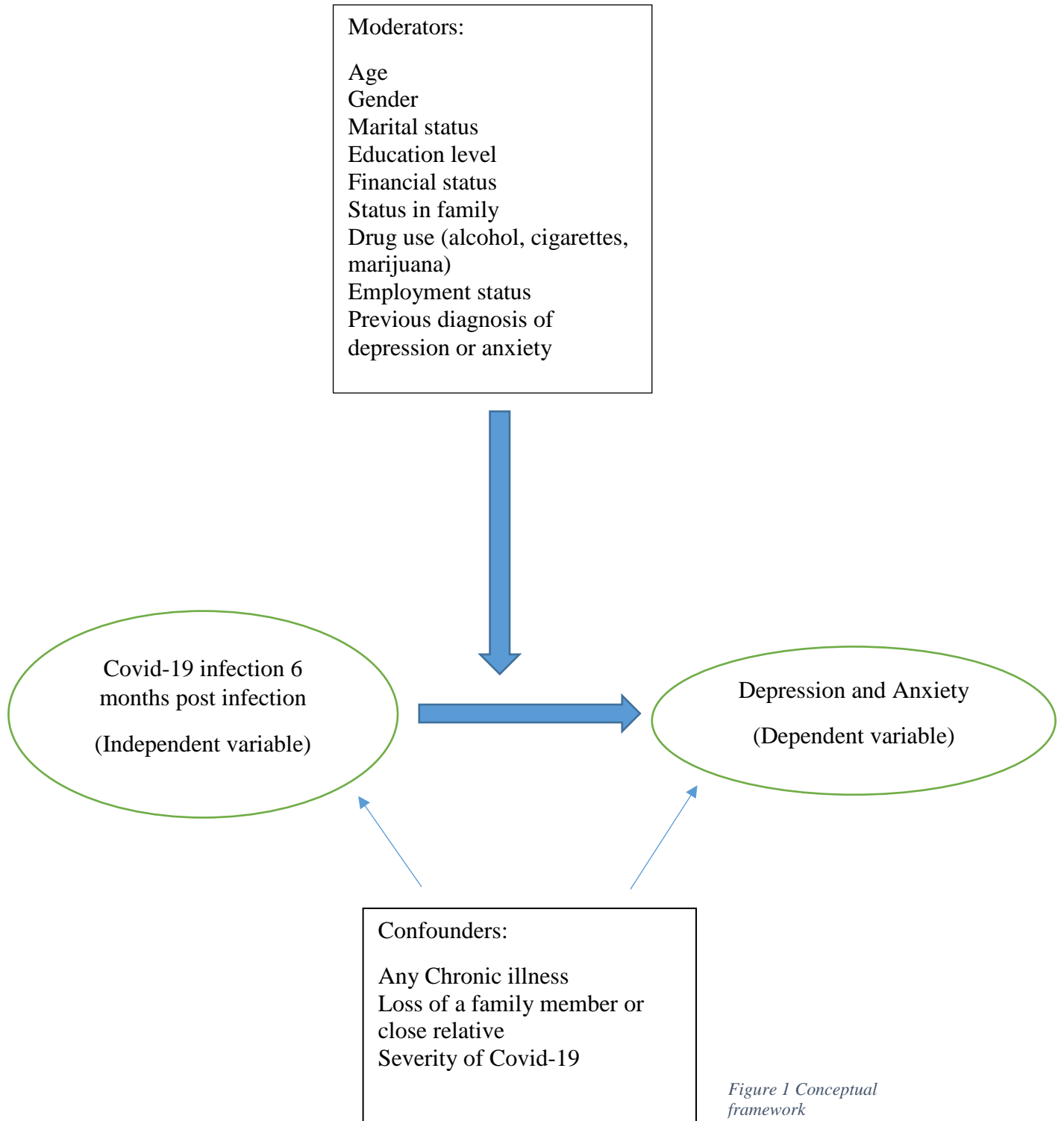
Multiple research studies have investigated various risk factors during the Covid-19 pandemic that are linked with depression and anxiety. A meta-analysis done by (Franz et al., 2022b) demonstrated that females had a significantly higher risk of experiencing post Covid-19 symptoms that include depression and anxiety, as compared to their male counterparts. On the other hand, a systemic review by (Deng et al., 2020b) showed no association with gender and the occurrence of depression and anxiety. (Zubayer et al., 2020) did a study and found that the rate of depression and anxiety was significantly higher in participants aged over 30 years as

compared to ages 18-30 years in Bangladesh, 4 months after the Covid-19 pandemic began, whereby a study done by (Ustun, 2021) showed that individuals aged between 18- 29 years were found to have higher depression scores than other age groups. The same study by (Ustun, 2021) also showed that participants of the study who had completed undergraduate education had significantly lower levels of depression than those who had graduated from high school or university.

(Pui et al., n.d.-a) did a study in Hong Kong to evaluate depression and anxiety of people during the pandemic. It was found that those working from home were less likely to have anxiety compared to those not working from home due to use of public means and contact with others. A similar study done in Indonesia by (Pradipta Lusida et al., 2022) revealed that HCWs were more prone to depression and anxiety. A study in Israel done by (Gilbar et al., 2022) showed that living with someone at high risk (elderly/ with chronic illness) and being younger predicted anxiety symptoms during the pandemic.

## 2.4 CONCEPTUAL FRAMEWORK

After multiple literature reviews, it was noted by the researcher that there were several possible risk factors that may influence depression and anxiety.



*Figure 1 Conceptual framework*

## 2.5 STUDY JUSTIFICATION

Covid-19 has been seen in several parts of the world and has caused many adverse effects on psychological and physical health. This may affect quality of life. From the literature review above, depression and anxiety has been linked to Covid-19 infection for patients and their relatives, HCWs who take care of the affected patients, and the general population too.

Studies done by (Franz et al., 2022a) and (Ahmed et al., 2021) looked into the long-term effects of Covid-19 on mental health. Long term follow- up studies have not been done in Kenya. This study will provide valuable insight into the long-term impact of Covid-19 on our population. The study findings could contribute to creating strategies to treat and prevent the long-term symptoms of depression and anxiety in future pandemics.

## 2.6 RESEARCH QUESTION

What is the prevalence of depression, anxiety and associated factors among patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital?

Specific questions:

1. What is the prevalence of depression among patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital?
2. What is the prevalence of anxiety among patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital?
3. What are the sociodemographic factors among patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital?
4. What is the association between depression, anxiety and the socio-demographic factors among patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital?
5. What are the Covid-19 illness related factors associated with depression and anxiety?

## 2.7 STUDY OBJECTIVES

### **Overall Objective**

The overall objective is to determine the prevalence of depression and anxiety among patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital.

### **Specific Objectives**

1. To determine the prevalence of depression among patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital.
2. To determine the prevalence of anxiety among patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital.
3. To determine the socio-demographic factors among patients who have recovered from Covid-19 infection post diagnosis at Avenue Hospital.

4. To find out the association between depression, anxiety and the socio-demographic factors in patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital.
5. To find out the association between depression and anxiety and Covid-19 illness related factors.

## CHAPTER THREE: RESEARCH METHODOLOGY

### 3.1 STUDY DESIGN

The study design used was a cross-sectional study.

### 3.2 STUDY SITE

The study was done at Avenue Hospital Nairobi (Parklands Branch). It was founded in 1976 by the late surgeon, Dr. B.P. Patel. It is one of the bigger growing private facilities in the country and devoted to providing high quality medical care at an affordable price. The hospital has a 131-bed capacity including an ICU, MICU, general medical and surgical wards, a secure and self-contained psychiatric ward, maternity ward and delivery room, private room, dialysis unit, and operating theatres for minor and major procedures.

Amid the waves of the Covid-19 pandemic, about three thousand (3000) confirmed cases have been registered at the facility for both outpatients and inpatients. The Covid isolation ward was available for an affordable price with high standards of care.

The study took place at the medical records office.

### 3.3 STUDY POPULATION

The participants in the study consisted of patients who have recovered from Covid-19, 6 months post diagnosis at Avenue Hospital.

#### INCLUSION AND EXCLUSION CRITERIA

##### Inclusion criteria:

- Patient who gave consent.
- Patient aged 18 years and above.
- Patient who has recovered from Covid-19 infection, 6 months or more post diagnosis.
- Patient who owns a phone/ smartphone.
- Patients who were seen at Avenue Hospital, Nairobi for management/ treatment of Covid-19 infection.

##### Exclusion criteria:

- Patient who did not consent to participate in the study.
- Patient below the age of 18 years.
- Patient who has recovered from Covid-19 infection, but it has not been 6 months or more post diagnosis.
- Patient who does not own a phone/ smartphone.



- Patients who were not seen at Avenue Hospital, Nairobi for management/ treatment of Covid- 19 infection.

### 3.4 SAMPLE SIZE CALCULATION

The sample size was determined using Cochran's formula (Cochran 1977).

$$n = \frac{z^2 pq}{e^2}$$

Where,

n = sample size

z = standard normal deviation corresponding to 95% confidence interval at 1.96

p = the estimated prevalence is 36% (Caleb et al, 2022)

q = 1- p

e = level of precision 0.05 (5%)

thus,

$$n = \frac{1.96^2 \times 0.36(1-0.36)}{0.05^2}$$

n = 354

The sample size was adjusted according to the average attendance during the Covid-19 wave of infection. On average 5 patients were found to be Covid positive at the facility, thus, in a week, about 35. The study period was 4 weeks, totaling to about 140 (one hundred and forty) participants.

Adjustment done using the finite population correction:

Where;

n' = adjusted sample size

N = population size (140)

n = sample size

$$n' = \frac{354}{1 + \frac{354-1}{140}}$$

n' = 103 participants.

Allowing for a 10% non-response rate, the minimum sample size required is 113 participants.

### 3.5 SAMPLING PROCEDURE

The study participants were selected using a simple random sampling method by randomly selecting numbers and thus selecting the patient to the corresponding numbers from the Covid register/ records. The register has contact details of each patient. Those who met the inclusion criteria were called via phone and given a comprehensive explanation of the study. An informed consent was obtained digitally from willing participants and study tools were then administered on phone or through a link to fill out a digital form. About 95% of the patients who came to Avenue Hospital were able to access their Covid results via email; this shows that they have access to smart/ digital devices that they know how to use. This was done until the determined sample size was reached.

### 3.6 RECRUITMENT AND DATA COLLECTION PROCEDURE

Participants were recruited from the Covid register/ records. All eligible participants who met the inclusion criteria were called via phone, given a comprehensive explanation of the study and those willing to participate in the study were requested to give verbal consent.

Patients who gave verbal consent to participate in the study were then sent a link via text message containing a digital form which consisted of a digital consent form as well. Those who consented digitally then proceeded to fill in the rest of the questionnaire.

## **Data Collection Tools**

### **Socio-Demographic Questionnaire**

Researcher-designed questionnaire which requested information regarding age, sex, marital status, education level, employment status, income, substance use and previous history of a mental illness among other particulars.

### **Beck Depression Inventory- II**

The BDI was developed by Aaron T. Beck in 1961, which is self-reported and involves 21 questions for measuring the severity of depression. It has been used for over 35 years and has been described as highly reliable regardless of the population.

The current version is BDI-II which was revised in 1996 to be more consistent with DSM-V criteria for depression. The tool has been translated and validated in Kiswahili by (Abubakar et al., 2016).

Each of the 21 questions has an answer, being scored on a scale of 0 to 3, and the total score is arrived at by adding up each individual score. Higher total scores indicate more severe depressive symptoms.

The standard cut off used are:

0-13 minimal depression

14-19 mild depression

20-28 moderate depression

29-63 severe depression.

### **Beck Anxiety Inventory**

This is a self-reported questionnaire developed by Aaron T. Beck which involves 21 questions that are used for measuring the severity of anxiety in people aged between 17 to 80 years. A study done by (Fydrich et al., 1992) to assess the reliability and validity of BAI showed that it fared better than Strait Anxiety Inventory.

Each question has an answer scored on a scale of 0-3, and the total score is arrived at by adding up each individual score. Higher total scores indicate more severe anxiety symptoms.

The standard cut off used are:

0-7 minimal level of anxiety

8-15 mild anxiety

16-25 moderate anxiety

26-63 severe anxiety

### **Covid illness check list**

Any Chronic illness?

Loss of a family member or a close relative due to Covid?

Severity of Covid.

## **3.7 DATA COLLECTION AND QUALITY CONTROL**

Data was collected using digital study questionnaires. Participants were called on the phone and informed about the study. After verbally consenting to participate, a link was sent to them. No names were used, only a random number allocated to maintain confidentiality.

## **3.8 DATA MANAGEMENT AND STATISTICAL ANALYSIS**

All data collected was kept under a password protected computer whereby only the researcher had access. Data collected using the Google form was downloaded to Microsoft Excel where it was cleaned, analyzed, and validated. This was later exported into SPSS for data analysis. Statistical analyses were done using version 26 of the Statistical Package for Social Scientist software (SPSS). Univariate analysis was done on the sociodemographic variables and summarized in the form of tables and graphs. Data was summarized into frequency and

percentages. Association between depression, anxiety and socio-demographic factors was determined using Chi-square test. A binary logistic regression model was also used to produce the odds ratio and corresponding Confidence Interval and P-values. P value of  $< 0.05$  was taken to show a statistically significant association

### 3.9 QUALITY ASSURANCE PROCEDURES

The researcher emphasized and ensured the study participants properly comprehended the questions and general concept of the study. A qualified biostatistician was involved for proper data entry, management, and analysis. All electronic data was stored in a password protected device which was accessible by the researcher only.

### 3.10 ETHICAL CONSIDERATION

Approval was sought from Kenyatta National Hospital and University of Nairobi Ethics and Research Committee- application approval number P142/02/2023- together with the ethical committee from Avenue Hospital and NACOSTI.

Confidentiality was observed by ensuring no names or patient registration numbers were used. However, to ensure participants requiring psychiatric treatment can be tracked, the researcher has a list that connects the research number to the hospital registration number which is only accessible to the researcher.

#### 3.10.1 BENEFITS OF THE STUDY

The data from the study may help the clinicians understand the prevalence of depression, anxiety, and associated factors, which can further help in the betterment of their management including regular screening and referral for appropriate interventions.

#### 3.10.2 POTENTIAL RISK

No physical harm transpired in the study. Nonetheless, discussion of Covid might cause psychological disturbance due to reliving the experience while having the Covid-19 infection. In case of this, counselling support was available.

#### 3.10.3 CONFIDENTIALITY

The researcher assured all the study participants that the study was strictly for research and academic purposes, and that all the information was treated with utmost confidentiality.

#### 3.10.4 VOLUNTARY PARTICIPATION

The researcher explained to the participants about the study procedures and the possible risk involved in the study. The participant's decision was respected if they declined to participate in the study.

## STUDY FLOW CHART

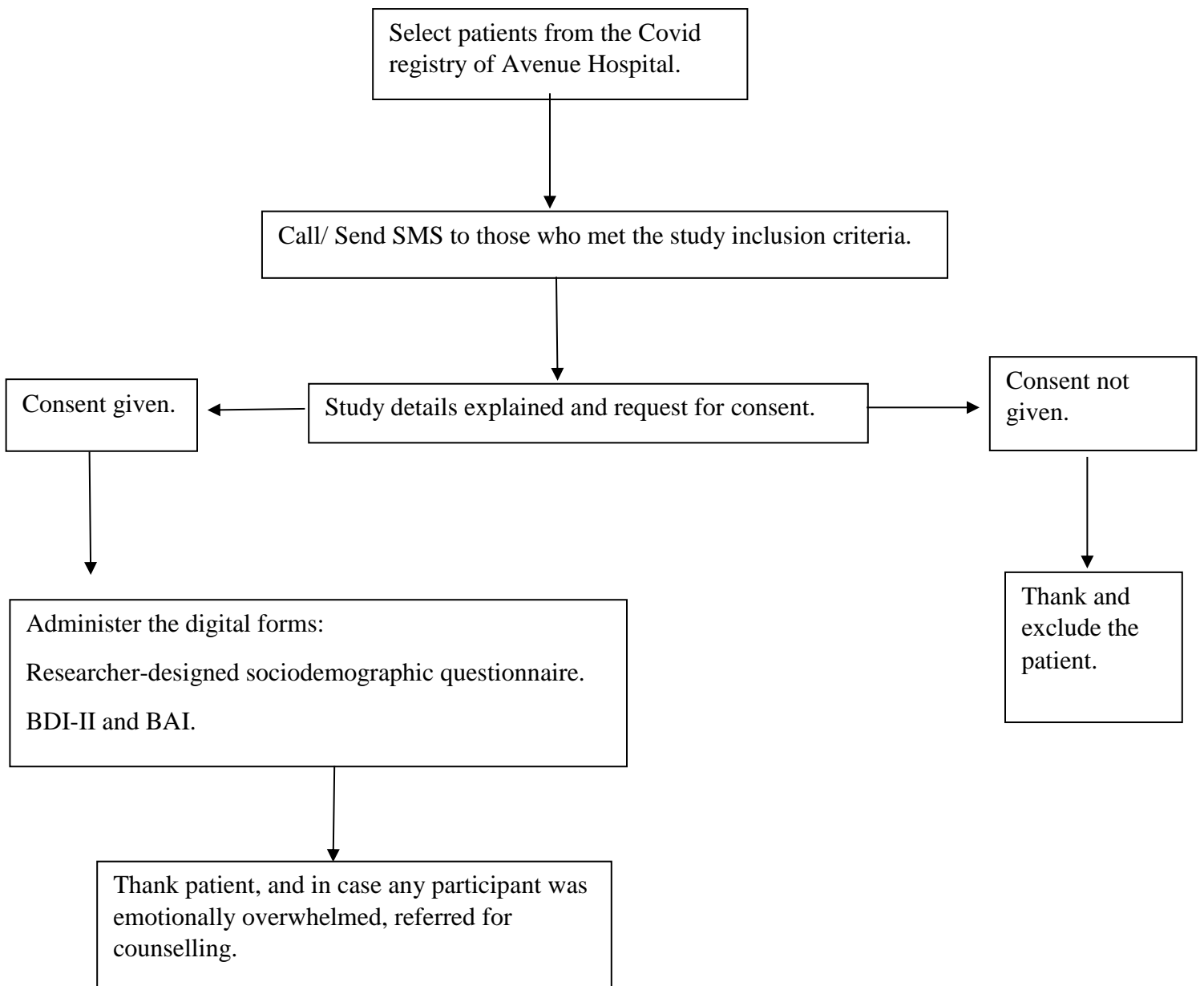


Figure 2 Study Flowchart

## CHAPTER FOUR: RESULTS

### 4.1 INTRODUCTION

This chapter describes the collected data following the study objectives which include the prevalence of depression and anxiety among patients who have recovered from Covid-19 infection, the socio-demographic factors, the association between depression, anxiety and socio-demographic characteristics, and association between Covid-19 illness related factors and depression and anxiety.

A total of 113 participants responded, out of which 4 decided to opt out.

### 4.2 SOCIO-DEMOGRAPHIC FACTORS OF THE RESPONDENTS

The socio-demographic data of the respondents are presented in table 4.1 below. Male participants were 54% and females 46%. Most participants were aged between 30-39 years (44%) followed by 40-49 years (22%). The majority of the participants were married at 58% followed by 35% who were single, 3% who were divorced/ widowed and 1% who were separated. In terms of education, 86% had completed tertiary level of education, 12% secondary, 1% primary and 1% no education level. In terms of employment, two thirds (2/3) were employed at 67%, 17% were self-employed, 11% with no employment and 5% retired. 71% of the participants were bread winners while 29% were dependants. Monthly income: 32% of the participants had an income of above KES. 200,000 and the rest earned less than KES. 200,000. Nearly half of the participants used substances (47%) where alcohol (38%) was mostly used. Participants with a previous diagnosis of depression and anxiety stood at 9% and 8% respectively. Other diagnoses of mental illnesses were at 8%, out of which 5% reported psychotherapy as part of treatment.

Table 4. 1: Socio-Demographic Factors of The Respondents

		<b>Frequency</b>	<b>Percentage</b>
Age in years	18-29	22	20%
	30-39	48	44%
	40-49	24	22%
	50-59	8	7%
	Above 60	7	7%
Gender	Female	50	46%
	Male	59	54%
Marital status	Single	39	35%
	Married	63	58%
	Separated	1	1%
	Divorced	3	3%
	Widowed	3	3%
Employment status	Not employed	12	11%
	Self employed	18	17%
	Employed	73	67%
	Retired	6	5%
Education Level	None	1	1%
	Primary	1	1%
	Secondary	13	12%
	Tertiary	94	86%
Role in the family	Dependent	32	29%
	Bread winner	77	71%
Income	None	10	9%
	less than 20,000	3	3%
	20,000-50,000	5	5%
	50,000-100,000	22	20%
	100,000-200,000	34	31%
	Above 200,000	35	32%
Any substance use		51	47%
	Alcohol	41	38%
	Cigarettes	7	6%
	Tobacco	5	5%
	Khat(miraa/mukokha)	7	6%
	Marijuana(bhangi)	8	7%
Previous diagnosis of anxiety and/or depression	None	85	78%
	Depression	10	9%
	Anxiety	9	8%
	Both	5	5%
Previous diagnosis of mental illness		9	8%

Mental illness treatment	Psychotherapy	6	5%
	Mirtaz	1	1%
	Venlafaxine	1	1%
	Did not take medication	1	1%

#### 4.3 PREVALENCE OF DEPRESSION

The prevalence of depression was measured using Beck Depression Inventory-II (BDI-II). The prevalence of depression was at 20% as shown in table 4.2 below, out of which mild depression (10%), moderate depression (5%), and severe depression (5%). 87 participants out of 109 had no depression, 11 had mild scores, 6 had moderate scores and 5 had severe scores.

Table 4 2 Prevalence and severity of Depression

		<b>Frequency</b>	<b>Percentage</b>
Depression Symptoms	Minimal	87	80%
	Mild	11	10%
	Moderate	6	5%
	Severe	5	5%
Prevalence of depression		22	20%



#### 4.4 PREVALENCE OF ANXIETY

Beck Anxiety Inventory (BAI) was used to measure the prevalence of anxiety. The prevalence was 31% as shown in table 4.3, out of which mild anxiety (19%), moderate anxiety (6%) and severe anxiety (6%).

Table 4 3 Prevalence and severity of anxiety

		<b>Frequency</b>	<b>Percentage</b>
Anxiety Symptoms	Minimal	75	69%
	Mild	20	19%
	Moderate	7	6%
	Severe	7	6%
Prevalence of Anxiety		34	31%

#### 4.5 COVID ILLNESS RELATED FACTORS

Table 4 4 Covid Illness Related factors

		<b>Frequency</b>	<b>Percentage</b>
Any Chronic Illness		21	19%
	Hypertension	12	11%
	Heart disease	4	4%
	Diabetes	10	9%
	Asthma/COPD	2	2%
Loss of a family member/close relative due to Covid-19		40	37%
Severity of symptoms of member lost	Mild	5	5%
	Moderate	8	7%
	Severe	27	25%

19% of the participants reported chronic illness where Hypertension (HTN) was seen (11%) followed by Diabetes (9%). Loss of a family member/ close relative due to Covid-19 infection was 37% and of which symptoms were reported as mild (5%), moderate (7%) and severe (25%).

#### 4.6. SOCIO-DEMOGRAPHICS FACTORS ASSOCIATED WITH DEPRESSION.

Table 4.5 and 4.6 display the socio-demographic and health related factors that are associated with depression (Bivariate analysis). Female participants exhibit higher chances of having depressive symptoms as compared to males (**O.R.5.56(1.88,16.50)**) (**P-0.002**). Participants who were married (**O.R.0.19(0.07,0.55)**) (**P-0.002**) exhibit lower chances of depression as compared to those who were single. Participants whose income was less than KES. 100,000 exhibit higher odds of having depressive symptoms in comparison to those who had an income of more than KES. 200,000. Those with previous diagnosis of depression (**P-0.007**) and other mental illness(es) (**P-0.012**) also had higher odds of depression. Participants who suffered the loss of a family member or close relative due to Covid-19 had higher odds of having depression (**O.R.3.21(1.23,8.41)**) (**P-0.018**) compared to those who had not lost a member. Those participants with anxiety were also seen to have a very high risk of depression (**O.R.14.00(4.53,43.31)**) (**P- <0.001**).

Table 4 5 Association between sociodemographic characteristics and depression.

		Depression Symptoms			OR(CI)	P-value
		No N=87	Yes N=22	Total N=109		
Age	18-29	16(18%)	6(27%)	22(20%)	Ref	
	30-39	39(45%)	9(41%)	48(44%)	0.62(0.19,2.01)	0.422
	40-49	19(22%)	5(22%)	24(22%)	0.70(0.18,2.74)	0.61
	50-59	7(8%)	1(5%)	8(7%)	0.38(0.04,3.78)	0.41
	Above 60	6(7%)	1(5%)	7(7%)	0.44(0.04,4.50)	0.492
Gender	Female	33(38%)	17(77%)	50(46%)	5.56(1.88,16.50)	<b>0.002</b>
	Male	54(62%)	5(23%)	59(54%)	Ref	
Marital status	Single	25(29%)	14(63%)	39(35%)	Ref	
	Married	57(66%)	6(27%)	63(58%)	0.19(0.07,0.55)	<b>0.002</b>
	Separated	1(1%)	0(0%)	1(1%)	NC	NC
	Divorced	2(2%)	1(5%)	3(3%)	0.89(0.07,10.75)	0.929
	Widowed	2(2%)	1(5%)	3(3%)	0.89(0.07,10.75)	0.929
Employment status	Not employed	7(8%)	5(23%)	12(11%)	Ref	
	Self employed	15(17%)	3(13%)	18(17%)	0.28(0.05,1.52)	0.14
	Employed	60(69%)	13(59%)	73(67%)	0.30(0.08,1.11)	0.071

	Retired	5(6%)	1(5%)	6(5%)	0.28(0.03,3.20)	0.305
Education Level	None	1(1%)	0(0%)	1(1%)	NC	NC
	Primary	0(0%)	1(5%)	1(1%)	NC	NC
	Secondary	10(11%)	3(13%)	13(12%)	1.27(0.32,5.08)	0.739
	Tertiary	76(88%)	18(82%)	94(86%)	Ref	
Role in the family	Dependent	22(25%)	10(45%)	32(29%)	Ref	
	Bread winner	65(75%)	12(55%)	77(71%)	0.41(0.15,1.07)	0.068
Income	None	6(7%)	4(18%)	10(9%)	7.11(1.26,40.21)	<b>0.026</b>
	less than 20,000	2(2%)	1(5%)	3(3%)	5.33(0.37,77.50)	0.22
	20,000-50,000	2(2%)	3(13%)	5(5%)	16.00(1.87,136.70)	<b>0.011</b>
	50,000-100,000	15(17%)	7(32%)	22(20%)	4.98(1.13,21.98)	<b>0.034</b>
	100,000-200,000	30(35%)	4(18%)	34(31%)	1.42(0.29,6.89)	0.662
	Above 200,000	32(37%)	3(14%)	35(32%)	Ref	
Loss of a family member/close relative due to Covid-19	No	60(69%)	9(41%)	69(63%)		
	Yes	27(31%)	13(59%)	40(37%)	3.21(1.23,8.41)	<b>0.018</b>

Table 4 6 Association between health-related factors and depression

		Depression Symptoms			OR(CI)	P-value
		No N=87	Yes N=22	Total N=109		
Any substance use	No	43(49%)	15(68%)	58(53%)	Ref	
	Yes	44(51%)	7(32%)	51(47%)	0.46(0.17,1.23)	0.12
Previous diagnosis of anxiety and/or depression	None	74(85%)	11(50%)	85(78%)	Ref	
	Depression	5(6%)	5(23%)	10(9%)	6.73(1.67,27.06)	<b>0.007</b>
	Anxiety	7(8%)	2(9%)	9(8%)	1.92(0.35,10.46)	0.45
	Both	1(1%)	4(18%)	5(5%)	26.91(2.75,263.35)	<b>0.005</b>
Previous diagnosis of mental illness	No	83(95%)	17(77%)	100(92%)	Ref	
	Yes	4(5%)	5(23%)	9(8%)	6.10(1.48,25.11)	<b>0.012</b>

Any Chronic Illness	No	68(78%)	20(91%)	88(81%)		
	Yes	19(22%)	2(9%)	21(19%)	0.36(0.08,1.67)	0.191
Hypertension	No	76(87%)	21(95%)	97(89%)		
	Yes	11(13%)	1(5%)	12(11%)	0.33(0.04,2.70)	0.3
Heart disease	No	83(95%)	22(100%)	105(96%)		
	Yes	4(5%)	0(0%)	4(4%)	NC	NC
Diabetes	No	78(90%)	21(95%)	99(91%)		
	Yes	9(10%)	1(5%)	10(9%)	0.41(0.05,3.44)	0.414
Asthma/COPD	No	85(98%)	22(100%)	107(98%)		
	Yes	2(2%)	0(0%)	2(2%)	NC	NC
Prevalence of Anxiety	No	70(80%)	5(23%)	75(69%)		
	Yes	17(20%)	17(77%)	34(31%)	14.00(4.53,43.31)	<b>&lt;0.001</b>

#### 4.7 SOCIO-DEMOGRAPHICS FACTORS ASSOCIATED WITH ANXIETY.

Table 4.7 and 4.8 display the socio-demographic and health related factors associated with anxiety (Bivariate analysis). Female participants exhibited higher odds (**3.72(1.57,8.78)**) (**P-0.003**) of having anxiety in comparison to males. Participants who were dependants (**2.69(1.13,6.41)**) (**P-0.025**) exhibited higher odds of having anxiety when compared to those who were bread winners. Participants having an income of less than KES. 100,000 were seen to have higher odds of anxiety when compared to those earning more than KES. 100,000. Having had a previous diagnosis of both depression and anxiety predisposed one to having higher odds of having anxiety as compared to when one had no diagnosis of depression and anxiety in the past. Those participants with depression only were also seen to have very high risk of anxiety (**14.00(4.53,43.31)**) (**P- < 0.001**).

Table 4 7 Association between sociodemographic characteristics and anxiety.

		Anxiety Symptoms			OR(CI)	P-value
		No N=75	Yes N=34	Total N=109		
Age (in years)	18-29	11(15%)	11(32%)	22(20%)	Ref	
	30-39	32(42%)	16(47%)	48(44%)	0.50(0.18,1.40)	0.187
	40-49	20(27%)	4(12%)	24(22%)	0.20(0.05,0.78)	0.02
	50-59	6(8%)	2(6%)	8(7%)	0.33(0.06,2.03)	0.233
	Above 60	6(8%)	1(3%)	7(7%)	0.17(0.02,1.62)	0.123
Gender	Male	48(64%)	11(32%)	59(54%)	Ref	
	Female	27(36%)	23(68%)	50(46%)	3.72(1.57,8.78)	<b>0.003</b>
Marital status	Single	22(29%)	17(50%)	39(35%)	Ref	
	Married	48(64%)	15(44%)	63(58%)	0.40(0.17,0.95)	0.039
	Separated	1(1%)	0(0%)	1(1%)	NC	NC
	Divorced	2(3%)	1(3%)	3(3%)	0.65(0.05,7.75)	0.731
	Widowed	2(3%)	1(3%)	3(3%)	0.65(0.05,7.75)	0.731
Employment status	Not employed	6(8%)	6(18%)	12(11%)	Ref	
	Self employed	14(18%)	4(12%)	18(17%)	0.29(0.06,1.40)	0.122
	Employed	50(67%)	23(67%)	73(67%)	0.46(0.13,1.58)	0.218
	Retired	5(7%)	1(3%)	6(5%)	0.20(0.02,2.27)	0.194
Education Level	None	1(1%)	0(0%)	1(1%)	NC	NC

	Primary	0(0%)	1(3%)	1(1%)	NC	NC
	Secondary	11(15%)	2(6%)	13(12%)	0.37(0.08,1.77)	0.213
	Tertiary	63(84%)	31(91%)	94(86%)	Ref	
Role in the family	Dependant	17(23%)	15(44%)	32(29%)	2.69(1.13,6.41)	<b>0.025</b>
	Bread winner	58(77%)	19(56%)	77(71%)	Ref	
Income	None	5(7%)	5(15%)	10(9%)	7.75(1.54,39.12)	<b>0.013</b>
	Less than 20,000	1(1%)	2(6%)	3(3%)	15.50(1.13,212.18)	<b>0.04</b>
	20,000-50,000	2(3%)	3(9%)	5(5%)	11.63(1.47,92.14)	<b>0.02</b>
	50,000-100,000	11(15%)	11(32%)	22(20%)	7.75(2.04,29.46)	<b>0.003</b>
	100,000-200,000	25(33%)	9(26%)	34(31%)	2.79(0.77,10.14)	0.119
	Above 200,000	31(41%)	4(12%)	35(32%)	Ref	
Loss of a family member/close relative due to Covid-19	No	52(69%)	17(50%)	69(63%)	Ref	
	Yes	23(31%)	17(50%)	40(37%)	2.26(0.98,5.20)	0.055

Table 4 8 Association between health-related factors and anxiety

		Anxiety Symptoms			OR(CI)	P-value
		No N=75	Yes N=34	Total N=109		
Any substance use	No	36(48%)	22(65%)	58(53%)	Ref	
	Yes	39(52%)	12(35%)	51(47%)	0.50(0.22,1.16)	0.108
Previous diagnosis of anxiety and/or depression	None	63(84%)	22(65%)	85(78%)	Ref	
	Depression	5(7%)	5(14%)	10(9%)	2.86(0.76,10.84)	0.121
	Anxiety	6(8%)	3(9%)	9(8%)	1.43(0.33,6.22)	0.632
	Both	1(1%)	4(12%)	5(5%)	11.46(1.21,108.07)	<b>0.033</b>
Previous diagnosis of mental illness	No	70(93%)	30(88%)	100(92%)	Ref	
	Yes	5(7%)	4(12%)	9(8%)	1.87(0.47,7.44)	0.376
Any Chronic Illness	No	61(81%)	27(79%)	88(81%)	Ref	
	Yes	14(19%)	7(21%)	21(19%)	1.13(0.41,3.11)	0.814
Hypertension	No	67(89%)	30(88%)	97(89%)	Ref	

	Yes	8(11%)	4(12%)	12(11%)	1.12(0.31,4.00)	0.865
Heart disease	No	72(96%)	33(97%)	105(96%)	Ref	
	Yes	3(4%)	1(3%)	4(4%)	0.73(0.07,7.26)	0.786
Diabetes	No	67(89%)	32(94%)	99(91%)	Ref	
	Yes	8(11%)	2(6%)	10(9%)	0.52(0.11,2.61)	0.429
Asthma/COPD	No	74(99%)	33(97%)	107(98%)	Ref	
	Yes	1(1%)	1(3%)	2(2%)	2.24(0.14,36.95)	0.572
Prevalence of Depression	No	70(93%)	17(50%)	87(80%)	Ref	
	Yes	5(7%)	17(50%)	22(20%)	14.00(4.53,43.31)	<b>&lt;0.001</b>

## CHAPTER 5: DISCUSSION

This study sought to assess the prevalence of depression and anxiety among one hundred and thirteen (113) patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital, Nairobi. In the first year of the Covid-19 pandemic, the worldwide prevalence of anxiety and depression shot up by a significant 25%, according to a scientific brief released by the (World Health Organization, 202 C.E.)

### 5.1. PREVALENCE OF DEPRESSION AND ANXIETY

This study was able to determine that there is a high prevalence of depression and anxiety among post Covid-19 patients attending Avenue Hospital, Nairobi. The World Health Organization has recognized that depression and anxiety are among the most common mental health disorders among the general population. It has been estimated that about 5% and 1 in 13 (7.7%) of the general population are at risk of developing either depression or anxiety at one point in their lives. Multiple studies have demonstrated that the risk of depression could go as high as 15% among the general population. These have been attributed to various lifetime risk factors. This study shows the prevalence of depression and anxiety among patients who have recovered from Covid-19 infection six months post diagnosis is higher than global estimates among the general population. The overall prevalence of depression was at 20% (mild- 10%, moderate- 5%, and severe- 5%). The overall prevalence of anxiety was 31% (mild- 19%, moderate- 6%, and severe- 6%).

The findings of this study was lower than a study done at the initial months of the COVID pandemic in 2020 in Kenya by (Ali et al., 2022) among postgraduate residents enrolled in nine different graduate medical education program at the Aga Khan university, Nairobi. It was found that depression was 64.3% and anxiety was at 51.5%. The high findings may be due to the period at which the study was done i.e., during August and November 2020 when COVID-19 was a new phenomenon, and this study was done 3 years later.

The findings of this study match those of a study done by (Franz et al., 2022b) which looked at a 1 year follow up of patients and demonstrates that a sizable portion of Covid- 19 survivors still experience residual symptoms which causes depression (23%). The follow up was done through phone interviews and clinics. The findings of this study differ from those of a study done by (Deng et al., 2020a), which had a higher prevalence of depression (45%) and anxiety (47%); reasons that can possibly explain these higher values include the usage of different screening tools, fact that most participants of the study were from China (the epicenter of the pandemic) and that it was done in the initial stages of the pandemic when quarantine was key. A study done by (Zubayer et al., 2020) in Bangladesh, among Bangladeshi people, depicted higher depression rates (47.2%) and anxiety rates (46.0%), compared to this study; it was one of the initial studies about Covid-19 done four months after the Covid- 19 outbreak when there was a lot of uncertainty combined with continued spread of the virus, increasing number of new cases, death of a beloved and fear of infection to which these higher values can be attributed. A study titled the long-term impact of Covid-19 infection done by (Ahmed et al., 2021) in Egypt had lower findings than this study where depression was at 11.5% and anxiety at 28%, however, the 28% anxiety is closely comparable to the 31% anxiety found in this study. (Kwobah et al., 2021) did a study locally (here in Kenya), which looked at mental disorders among health care workers during the early phase of the Covid-19 pandemic; it showed that depression was at 32.1% and



anxiety was at 36%, (which are higher than the findings of this study), with unmarried females bearing the bigger burden (which matches the findings of this study). Higher values of anxiety (mild- 75.1%, moderate- 15.5%, and severe- 9.4%) were seen in Sudan, in a study done by (Abas et al., 2021b) among Sudanese university students, amid the Covid-19 pandemic, which used BAI; these higher values may be related to economic strains, poor health systems, non-compliance with the curfew measures and preventive etiquette like covering the mouth when coughing and sneezing. The findings of this study are lower than those of a study done in China by (Xiao et al., 2022b) (depression: mild- 77%, moderate- 12%, severe- 11% and anxiety: mild- 77%, moderate- 15%, severe- 7.5%) due to somatic symptoms after discharge, perceived impact of being infected, discrimination, self-stigma and perceived affiliate stigma, and in India (depression- 28%, anxiety- 35%) by (Gupta et al., 2020b) due to the already high existing prevalence of mental disorders, along with uncertainty about the disease course, potential mortality, inadequate infrastructure, lack of enough protective equipment and definitive drug treatment/ prophylaxis, lack of vaccine and high incidence of infection among frontline healthcare workers (as the study was conducted among armed forces doctors during the second wave of the pandemic, compared to this study which was conducted recently on Covid- 19 survivors at a time when coronavirus infections were low).

The findings of this study are higher than those of a study done in Netherlands (depression- 12%, anxiety- 10%) by (Van Den Borst et al., 2021) and in Hong Kong (depression- 19%, anxiety- 14%) by (Pui et al., n.d.-b). The study done by (Pui et al., n.d.-a) showed that their findings were higher than previous studies done in their country with a quarter of the respondents reporting that their mental health had deteriorated since the pandemic began. It was also noteworthy that this high rate was strongly associated with functional impairment, alcohol or drug coping, negative religious coping, extreme hopelessness, and passive suicidal ideation. This difference whereby the findings of this study are higher is due to the tools used; this study used BDI-II and BAI whereas the other studies used PHQ-9, GAD-7 and HADS scale.

A similar study by (Ettman et al., 2020) in the USA reported a higher rate (more than 3-folds) of depression and anxiety during Covid-19 compared with before Covid-19 pandemic (mild- 25% vs 6%, moderate- 15% vs 6%, severe- 5% vs 1%); these increased values can be attributed to the fact that the study was conducted at the start of the Covid- 19 pandemic when the confirmed cases and deaths from the virus were constantly increasing amid unrest regarding the situation. In some studies, compared to this study, despite having used the same screening tools, varied values of depression and anxiety were seen, and this perhaps points to the fact that different people in different parts of the world had different reactions to the coronavirus outbreak.

For this study, data collection took place when Covid-19 infections were low, and no restrictions were being observed; this has contributed to the low prevalence rates.

## 5.2 SOCIODEMOGRAPHIC FACTORS ASSOCIATED WITH DEPRESSION AND ANXIETY

Out of all the participants in this study who reported symptoms of depression and anxiety, the female gender was seen to be at a higher risk of suffering from both, depression (77%) and anxiety (68%) as compared to their male counterparts who suffered from depression (23%) and anxiety (32%). The findings of this study match those of a study done by (Hossain et al., 2021) where women were also seen to have higher rates of depression and anxiety as compared to men; depression was seen at 37.8% and anxiety was seen at 46.5% for females, whereas depression

was seen at 36.7% and anxiety was seen at 41.1% for men. The study by (Hossain et al., 2021) was a systematic review and meta-analysis to determine the prevalence of anxiety and depression in South Asia during Covid- 19, thus concentrated on South Asian countries and it was noted that women in these countries had limited autonomy, empowerment, participation in social economic activities, and access to mental health services and resources. As much as this study and the one by (Hossain et al., 2021) shows that females are more likely to suffer from anxiety and depression more than males, the findings of this study are lower than those of the study by (Hossain et al., 2021); the difference can be attributed to the fact that one is a meta-analysis while one is a cross-sectional study and also the time at which the study was carried out. Studies that were done at the initial stages of COVID-19 pandemic showed higher rates due to the uncertainty of the disease. Female hormonal fluctuations are also seen as a trigger for depression and anxiety, and this puts the female gender at a higher risk of having depression and anxiety, as compared to their male counterparts as identified by (Kundakovic & Rocks, 2022). It was also proposed by (Riecher-Rössler, 2017) that women might be more vulnerable to depression and anxiety because of their greater monthly and lifespan fluctuation of sex hormones which include estradiol and progesterone. Another study that showed that females had higher levels of depression compared to other participants was a study by (Ustun, 2021). One important psychosocial risk factor for mental disorders is gender-based violence, which is covered in a review by (Oram et al., 2017) that clearly showed that women, much more often than men, experience different forms of gender-based violence, and that this experience is associated with an increased prevalence of depression and anxiety in females, shedding light on to the fact that females have always, with or without Covid-19, carried the burden of suffering from depression and/ or anxiety.

Having an income of less than KES 100,000 predisposed one to suffering from depression and anxiety. This study is in line with a study by (Posel et al., 2021b) whereby having low or no income during Covid put one at risk of depression as compared to those who retained paid employment during the Covid-19 lockdown. The analysis by (Posel et al., 2021a) also revealed that there were no mental health benefits to being on unpaid leave, but having paid leave had a strong and significant positive effect on the mental health of working adults. It was also seen by (Pinchoff et al., 2021) that loss of income during Covid-19 greatly affected household dynamics, leading to depressive symptoms among adolescent mental health in Kenya, with over a third (36%) of adolescents reporting highest depressive symptoms among the older age (15 -19 years). In the same study by (Pinchoff et al., 2021) adult loss of income was associated with skipping meals, household tensions or violence, poor health seeking behaviors and worsening adolescent medical and depressive symptoms. In comparison, in this study too, being a dependant was significantly associated with anxiety as compared to being the bread winner of the family. As seen above, in general, having more resources was associated with a lower prevalence of depression and anxiety symptoms. Another study, done by (Lau et al., 2021) in Kenya looking at how Covid-19 impacted coastal communities found that, coastal communities in Kenya experienced livelihood losses and disruptions in income generation. These communities were dependent on fishing and fish trading which was affected due to the lockdown restrictions on movement and curfews leading to poverty and prolonged food insecurity.

Having a previous diagnosis of only depression or both, depression and anxiety, or any other mental illness put one at a higher risk of being depressed during the time of the Covid-19 pandemic as seen in this study. At the same time, this study shows that one was predisposed to having anxiety when he/ she had a previous diagnosis of both, depression and anxiety. This

study's findings support the general agreement that a history of having both, depression and anxiety, has a significant association with having depression and anxiety in patients' post-recovery of Covid-19 infections, as compared to those who do not have any mental illness, as matches the results of a study done by (Modarresi et al., 2022).

In this study, being married was seen as being protective against depression and this compares to a study by (Ustun et al., 2021) whereby not being single, divorced or widowed, but being married was seen to be protective against depression. The same study by (Ustun, 2021) also showed that those with an income lower than their expenses had higher rates of depression. Similar results were seen in a study done by (Ettman et al., 2020) in USA whereby married people had a lower rate of depression compared with those who were widowed, divorced, separated or never married. It was also seen that having a higher household saving of \$5000 was protective for depression symptoms as compared to having less.

The findings of this study reveal that individuals who endured the death of a close tie during the pandemic experienced greater depressive symptoms, which is parallel to a study done by (Grace, 2021).

A study in Ethiopia by (Hajure et al., 2020) found very high rates of depression (56%) and anxiety (62%) among chronically ill medical patients amid Covid-19, as did the study by (Modarresi et al., 2022) which showed depression and anxiety was significantly increased in patients with existing medical conditions, yet in this study there was no significant association with chronic illness. This could be attributed to the fact that this study was done at a time when Covid- 19 infections were low and access to hospitals and medical care was not limited, so perhaps reduced anxiety as people were back to normal routine. Also, vaccinations against the coronavirus were readily available and many people had been keen on getting vaccinated. This study found no significant association between depression and different factors like age, employment status, level of education, role in the family, substance use and chronic illness. Also, no significant association was found between anxiety and other factors like marital status, age, level of education, substance use, employment status, and chronic medical illness.

### 5.3 CONCLUSION

This study concludes that it is evident that depression and anxiety is prevalent among patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital, Nairobi. Female gender and a lower income were associated with depression and anxiety. Depression and anxiety are associated with each other. Routine screening for depression and anxiety should be implemented to enhance early detection and management.

### 5.4 RECOMMENDATION

- Initiate and establish the need for continuous education of healthcare professionals, in the various sections of medicine, to screen for depression and anxiety among post Covid patients, and a safe referral system providing care to those who need it. This is because early detection of depression and anxiety allows for timely management of the disorders with better outcome.
- All post Covid patients to be offered psychological support and good counselling sessions, along with psychiatric assistance if need be, when they screen positive for depression and/ or anxiety.

- Along with treating the physical ailments/ symptoms of Covid-19 infection, both during and after the infection, doctors should also lay focus on the mental wellbeing of the patient.
- A similar study to be done at a public health facility to give insight into what the prevalence of depression and anxiety is in the other population, keeping in mind that majority of the public visit public health institutions in Kenya.
- A longitudinal study to be carried out to evaluate the prevalence of depression and anxiety among post Covid-19 patients to see the long term effects the infection can have on the mental health of people.

#### 5.5 LIMITATIONS OF THE STUDY

- The findings in this study cannot be generalized since the study was conducted on a specific population group.
- This study was conducted at Avenue Hospital which is a private health facility and therefore the study and the results cannot be generalized to a public health facility and the general population.
- The study is a cross sectional study. A longitudinal study would be ideal for follow up of patients.
- Mean score for age and income was not calculated since data was collected in a categorical format.

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## APPENDICES

### Appendix I: Participant Informed Consent

#### **Study Title**

The prevalence of depression and anxiety in patients who have recovered from Covid-19 infection 6 months post diagnosis at Avenue Hospital Nairobi.

#### **Introduction**

Greetings!

My name is Dr. Ajeel Vaja, a Master of Medicine (Psychiatry) student from the University of Nairobi, department of Psychiatry. I am conducting the above- named study and you have been chosen at random to take part in it. The study involves research, the purpose of which is to determine the prevalence of depression, anxiety and associated factors among patients who have recovered from Covid-19 infection 6 months post diagnosis.

Your decision to participate in this study is voluntary. If you agree to participate in this study, I will send you a link which will contain a digital questionnaire, which you will be expected to fill honestly. It should take about 15mins of your time. In case you do not have a smart phone at this time, the questionnaire can be administered on phone. If you decline to participate in the study, the questionnaire will not be sent to you. Should you wish to leave the study after having consented to participate, you will be required to fill in Appendix V on the questionnaire and submit your form.

There is no physical risk involved in this study. There may be psychological/ emotional risk during the study, and for that you will have access to counselling services for free.

There is no monetary gain for your participation in this study and it will not cost you anything apart from the 15 minutes of your time.

The information you provide will be treated confidentially and only authorized members of this study will have access to it. Names of participants will not be used, and a study number will be allocated to each form.

In case you have any questions about this research you may contact me via a text message or phone call on +254 724 664103. My supervisors include Prof. Muthoni Mathai, Associate Professor, Department of Psychiatry, University of Nairobi, who can be contacted via email on [muthonimathai@gmail.com](mailto:muthonimathai@gmail.com) or [amuthoni@uonbi.ac.ke](mailto:amuthoni@uonbi.ac.ke), or via phone on +254 727 329904 and Dr. Anne Mbwayo, Clinical Psychology, Lecturer, Department of Psychiatry, University of Nairobi, who can be contacted via email on [annembwayo@gmail.com](mailto:annembwayo@gmail.com), or via phone on +254 733 823896.

For more information about your rights as a research participant you may contact the Secretary/ Chairperson at Kenyatta National Hospital- University of Nairobi Ethics and Research Committee Telephone No. 2726300 Ext. 44102 or email [uonknherc@uonbi.ac.ke](mailto:uonknherc@uonbi.ac.ke).

Your decision to participate in this research is voluntary. You are free to decline participation and can withdraw from the study at any time. If you agree to participate, click the box.

I certify that I have consented after reading the above. Study number: \_\_\_\_\_

Appendix II. Questionnaire

Socio-demographic information: fill in all sections.

Question	Response (tick appropriate response)
Age	<input type="checkbox"/> 18-29 years <input type="checkbox"/> 30-39 years <input type="checkbox"/> 40-49 years <input type="checkbox"/> 50-59 years <input type="checkbox"/> Above 60 years
Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
Marital status	<input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Separated <input type="checkbox"/> Divorced <input type="checkbox"/> Widowed
Role in the family	<input type="checkbox"/> Bread winner <input type="checkbox"/> Dependent
Employment	<input type="checkbox"/> Self-employed. <input type="checkbox"/> Employed <input type="checkbox"/> Not employed <input type="checkbox"/> Retired
Education (highest level completed)	<input type="checkbox"/> None <input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Tertiary <input type="checkbox"/> Others(specify) .....
Average income per month (Kenyan Shillings.)	<input type="checkbox"/> Less than 20,000 <input type="checkbox"/> 20,000 – 50,000 <input type="checkbox"/> 50,000-100,000 <input type="checkbox"/> 100,000 – 200,000 <input type="checkbox"/> Above 200,000
Substance use	<input type="checkbox"/> Alcohol- frequent or occasionally and amount <input type="checkbox"/> Cigarettes- frequent or occasionally <input type="checkbox"/> Tobacco- frequent <input type="checkbox"/> Khat(miraa/mukokha) <input type="checkbox"/> Marijuana(bhangi)
Have you ever been diagnosed with	<input type="checkbox"/> Depression <input type="checkbox"/> Anxiety <input type="checkbox"/> Both
Have you ever been diagnosed with any other type of mental illness?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If the answer above is yes, please indicate the treatment you were on.	

### Appendix III. Beck's Depression Inventory II

Please read each group of statements carefully and pick out one in each group that best describes the way you have been feeling after 6 months recovering from Covid-19.

1. Sadness

- 0 I do not feel sad.
- 1 I feel sad much of the time.
- 2 I am sad all the time.
- 3 I am so sad or unhappy that I can't stand it.

2. Pessimism

- 0 I am not particularly discouraged about the future.
- 1 I feel discouraged about the future.
- 2 I have nothing to look forward to.
- 3 I feel the future is hopeless and that things cannot improve.

3. Past failure

- 0 I do not feel like a failure.
- 1 I have failed more than I should have.
- 2 As I look back, I see a lot of failures.
- 3 I feel I am a total failure as a person.

4. Loss of pleasure

- 0 I get as much pleasure as I ever did from the things I enjoy.
- 1 I don't enjoy things as much as I used to.
- 2 I get very little pleasure from the things I used to enjoy.
- 3 I can't get any pleasure from the things I used to enjoy.

5. Guilty feelings

- 0 I don't feel particularly guilty.
- 1 I feel guilty over many things I have done or should have done.
- 2 I feel quite guilty most of the time.
- 3 I feel guilty all the time.

6. Punishment feelings

- 0 I don't feel I am being punished.
- 1 I feel I may be punished.
- 2 I expect to be punished.
- 3 I feel I am being punished.

7. Self-dislike

- 0 I feel the same about myself as ever.

- 1 I have lost confidence in myself.
- 2 I am disappointed in myself.
- 3 I dislike myself.

8. Self-criticalness

- 0 I don't criticize or blame myself more than usual.
- 1 I am more critical of myself than I used to be.
- 2 I criticize myself for all of my faults.
- 3 I blame myself for all my faults.

9. Suicidal thoughts or wishes

- 0 I don't have any thoughts of killing myself.
- 1 I have thoughts of killing myself, but I would not carry them out.
- 2 I would like to kill myself.
- 3 I would kill myself if I had the chance.

10. Crying

- 0 I don't cry any more than I used.
- 1 I cry more than I used to.
- 2 I cry over every little thing.
- 3 I feel like crying, but I can't.

11. Agitation

- 0 I am no more restless or wound up than usual.
- 1 I feel more restless or wound up than usual.
- 2 I am so restless or agitated, it's hard to stay still.
- 3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of interest

- 0 I have not lost interest in other people or activities.
- 1 I am less interested in other people or things than before.
- 2 I have lost most of my interest in other people or things.
- 3 It's hard to get interested in anything.

13. Indecisiveness

- 0 I make decisions about as well as ever.
- 1 I find it more difficult to make decisions than usual.
- 2 I have much greater difficulty in making decisions than I used to.
- 3 I have trouble making any decisions.

14. Worthlessness

- 0 I do not feel I am worthless.
- 1 I don't consider myself as worthwhile and useful as I used to.
- 2 I feel more worthless as compared to others.

3 I feel utterly worthless.

15. Loss of energy

- 0 I have as much energy as ever.
- 1 I have less energy than I used to have.
- 2 I don't have enough energy to do very much.
- 3 I don't have enough energy to do anything.

16. Changes in sleeping pattern

- 0 I have not experienced any change in my sleeping.
- 1a I sleep somewhat more than usual.
- 1b I sleep somewhat less than usual.
- 2a I sleep a lot more than usual.
- 2b I sleep a lot less than usual.
- 3a I sleep most of the day.
- 3b I wake up 1-2 hours early and can't get back to sleep.

17. Irritability

- 0 I am not more irritable than usual.
- 1 I am more irritable than usual.
- 2 I am much more irritable than usual.
- 3 I am irritable all the time.

18. Changes in appetite

- 0 I have not experienced any changes in my appetite.
- 1a My appetite is somewhat less than usual.
- 1b My appetite is somewhat greater than usual.
- 2a My appetite is much less than before.
- 2b My appetite is much greater than usual.
- 3a I have no appetite at all.
- 3b I crave food all the time.

19. Concentration difficulty

- 0 I can concentrate as well as ever.
- 1 I can't concentrate as well as usual.
- 2 It's hard to keep my mind on anything for a very long.
- 3 I find I can't concentrate on anything.

20. Tiredness and fatigue

- 0 I am no more tired or fatigued than usual.
- 1 I get more tired or fatigued more easily than usual.
- 2 I am too tired or fatigued to do a lot of the things I used to do.
- 3 I am too tired or fatigued to do most of the things I used to do.



21. Loss of interest in sex

- 0 I have not noticed any recent change in my interest in sex.
- 1 I am less interested in sex than I used to be.
- 2 I am much less interested in sex now.
- 3 I have lost interest in sex completely.

### Beck Anxiety Inventory (BAI)

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling hot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wobbliness in legs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unable to relax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fear of worst happening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dizzy or lightheaded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heart pounding/racing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unsteady	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Terrified or afraid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nervous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling of choking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hands trembling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shaky / unsteady	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fear of losing control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty in breathing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fear of dying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indigestion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faint / lightheaded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Face flushed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hot/cold sweats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix V: Study Timelines

Year	2022		2023							
Months	June	Dec	Jan	Feb	March	April	May	June	July	August
Proposal writing										
Study approval by supervisors										
Ethics										
Data collection and entry										
Data analysis										
Write up										
Submission										
Presentation of final research										
Work on recommendations										
Final project submission										

Appendix VI: Budget

Items	Quantity	Days	Unit Cost	Total cost (KES)
Ethics and NACOSTI Payment	1	1	1	3,000
Airtime	1	30	200	6,000
Transport	1	30	300	9,000
Miscellaneous	1		5,000	5,000
Data Analysis	1	5	3,000	15,000
Total				38,000
Contingency (10%)				3,800
Grand Total				41,800

Appendix VII: ERC Approval



UNIVERSITY OF NAIROBI  
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P O BOX 19676 Code 00202  
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Website: <http://www.erc.uonbi.ac.ke>  
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Ref: KNH-ERC/A/223

5<sup>th</sup> June, 2023

Dr. Ajeel Ashok Vaja  
Reg No. H58/37257/2020  
Dept. of Psychiatry  
Faculty of Health Sciences  
University of Nairobi



Dear Dr. Vaja,

**ETHICAL APPROVAL-RESEARCH PROPOSAL: PREVALENCE OF DEPRESSION, ANXIETY AND ASSOCIATED FACTORS AMONG PATIENTS WHO HAVE RECOVERED FROM COVID-19 INFECTION 6 MONTHS POST DIAGNOSIS AT A VENUE HOSPITAL NAIROBI (P142/02/2023)**

This is to inform you that KNH-UoN ERC has reviewed and approved your above research proposal. Your application approval number is **P142/02/2023**. The approval period is 5<sup>th</sup> June 2023 –4<sup>th</sup> June 2024.

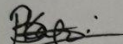
This approval is subject to compliance with the following requirements;

- i. Only approved documents including (informed consents, study instruments, MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by KNH-UoN ERC.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KNH-UoN ERC 72 hours of notification.
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH-UoN ERC within 72 hours.
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to KNH-UoN ERC.

Protect to discover

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,





**DR. BEATRICE K.M. AMUGUNE**  
**SECRETARY, KNH- UoN ERC**

- c.c.     The Dean, Faculty of Health Sciences, UoN  
          The Senior Director, CS, KNH  
          The Chairperson, KNH- UoN ERC  
          The Assistant Director, Health Information Dept., KNH  
          The Chair, Dept. of Psychiatry, UoN  
          Supervisors: Prof. Muthoni Mathai, Dept. of Psychiatry, UoN  
                      Dr. Anne Mwayo, Dept. of Psychiatry, UoN.

Protect to discover


Appendix VIII: NACOSTI Approval

  
REPUBLIC OF KENYA

  
NATIONAL COMMISSION FOR  
SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 146477 Date of Issue: 02/July/2023

**RESEARCH LICENSE**




**This is to Certify that Dr. Ajeel Ashok Vaja of University of Nairobi, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: PREVALENCE OF DEPRESSION, ANXIETY AND ASSOCIATED FACTORS AMONG PATIENTS WHO HAVE RECOVERED FROM COVID-19 INFECTION 6 MONTHS POST DIAGNOSIS AT AVENUE HOSPITAL NAIROBI for the period ending : 02/July/2024.**


License No: NACOSTI/P/23/26931

146477

Applicant Identification Number

  
Director General  
NATIONAL COMMISSION FOR  
SCIENCE, TECHNOLOGY &  
INNOVATION

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**See overleaf for conditions**

**THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)**  
Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

**The National Commission for Science, Technology and Innovation**, hereafter referred to as the Commission, was established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

**CONDITIONS OF THE RESEARCH LICENSE**

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
  - i. Endanger national security
  - ii. Adversely affect the lives of Kenyans
  - iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
  - iv. Result in exploitation of intellectual property rights of communities in Kenya
  - v. Adversely affect the environment
  - vi. Adversely affect the rights of communities
  - vii. Endanger public safety and national cohesion
  - viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
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7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
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12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and  
Innovation(NACOSTI),  
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