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ASSESSMENT OF THE QUALITY OF LIFE AND COPING STRATEGIES OF COVID-19 RECOVERED PATIENTS AT THE GHANA INFECTIOUS DISEASE CENTER

BY

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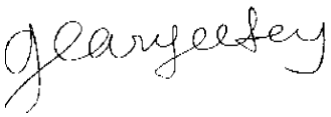
DECLARATION

I, **Esinam Aku Amedewonu**, hereby declare that apart from the references which were used and acknowledged duly, this dissertation is the product of my investigation, which was supervised and has not been submitted elsewhere in whole or in part for the attainment of any other degree. Where other people's research have been used, these have been acknowledged accordingly.



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DEDICATION

This dissertation is dedicated to my loving mother.

Glory be to God

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I am very grateful for grace, favour, and countless mercies from God, our heavenly father.

My sincere gratitude goes out to my academic supervisor, Dr. Genevieve C. Aryeetey, for offering me the needed guidance over the past year.

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ABSTRACT

Background: Coronavirus Disease of 2019 (COVID-19) is the first global pandemic of the 21st century. Initially thought to be a respiratory disease, it is now known to affect multiple organ systems with variable presentation and devastating or fatal complications. Symptoms have been noted to persist after 30 days following recovery, resulting in what is known as "Long COVID". Despite the large numbers of people who have suffered this disease globally and in Ghana, mid- to long-term impact of COVID-19 on a person's general well-being, physical function, and ability to return to work has not been fully investigated. This study sought to examine the self-rated quality of life, physical function, and general health in Ghanaian patients following clinical recovery from COVID-19 infection and the coping strategies used.

Objective: To determine the Quality of Life (QoL) and coping strategies of Covid-19 recovered patients at the Ghana Infectious Disease Centre.

Methods: A descriptive cross-sectional and hospital-based study was carried out on 150 recovered patients at the post-COVID-19 Review Clinic of the Ghana Infectious Disease Centre (GIDC). Quality of Life was estimated using the EuroQol Group Association five-domain, five level questionnaires (EQ-5D-5L). The Brief-COPE scale was used to assess the coping strategies of patients. Analysis of variance and linear regression was used to determine factors associated with QoL and coping strategies. Spearman correlation was used to establish the association between QoL and coping strategies.

Results: The mean quality of life was slightly higher on the EQ-5D-5L percentage scale (81.5 ± 12.0) % compared to the self-reported EQ-VAS scale (75.6 ± 22.0) %. Scores

above 50% and approaching 100% depict an increasingly good quality of life. Persistence of symptoms after 30 days and the development of complications were significant predictors for both quality-of-life scales. Differences were not significantly observed for all other socio-demographic factors such as marital status, place of residence, and ethnicity as well as other COVID related factors such as access to rehabilitative centres on their quality of life. Problem-focused strategy was the most used coping strategy among respondents (2.71± 0.64). Age, persistence of symptoms, being a non-healthcare worker, and development of complications post-COVID-19 were significant predictors of coping strategies. There were no significant differences observed for the other socio-demographic characteristics (sex, religion, ethnicity, marital status, place of residence and occupation) across all three coping strategy styles. Increasing quality of life was associated with decreasing coping mechanisms.

Conclusion: Quality of life was relatively good post-infection. Persistence of symptoms and development of complications significantly predicted one's quality of life. Participants generally adopted positive coping strategies during the COVID pandemic with a decreasing need to use a coping strategy as their QoL improved.

Keywords: COVID-19, quality of life, recovered patients, coping strategies, Ghana

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COVID-19 – Coronavirus Disease

GHS – Ghana Health Service

MERS – Middle East Respiratory Syndrome

OHRP – Office for Human Research Protections

PI – Principal Investigators

PPE – Personal Protective Equipment

SARS – Severe Acute Respiratory Syndrome

SARS-CoV-2 – Severe Acute Respiratory Syndrome Coronavirus 2

1 INTRODUCTION

1.0 Background of the Study

The Coronavirus disease 2019 (COVID-19) outbreak has significantly impacted the entire world (The Lancet, 2020). This novel disease was first noted on the 31st of December, 2019, when a report was made by Wuhan Municipal Health Commission to the World Health Organization on a cluster of an atypical pneumonia in Wuhan of the Hubei Province in China (Zhou et al., 2020). The cause of this pneumonia was later identified as a virus of the coronaviridae family and was initially named 2019-nCoV (CDC, 2020; The Lancet, 2020). Subsequently, the WHO renamed this virus as the Severe Acute Respiratory Syndrome Coronavirus (SARS CoV-2) and the disease as Coronavirus Disease 2019 or simply COVID-19 (WHO, 2020d). Due to the rapid and highly contagious nature of spread, by the 29th of April 2020, COVID-19 had been confirmed in over 3 million people globally (Johns Hopkins University, 2020). On 11th March 2020, the WHO declared COVID-19 a pandemic, confirming the prevalence of the disease in a vast geographical area and affecting a remarkably high proportion of the world's population (WHO, 2020d).

Human-to-human spread is primarily a droplet-based transmission, but aerosol transmission is also believed to be a possible mode of spread (World Health Organization, 2020c). The incubation period averages 5-6 days, but reports by the WHO have suggested anything up to 14 days. The disease has a varying range of presentation from being asymptomatic, through presenting with symptoms similar to the common cold to more severe respiratory, enteric, hepatic and neurological symptoms (Adhikari et al., 2020).

Patients with mild to moderate disease often present with fever, cough, fatigue, dyspnoea, tachypnoea and decreased oxygen saturation requiring supplemental oxygen and necessitating hospitalization (Centers for Disease Control and Prevention, 2020; Huang et al., 2020; Richardson et al., 2020). According to these studies, within ten to fourteen days, quite a number of patients sufficiently recover and are discharged from the hospital. However, majority of patients may still not be void of symptoms. In fact, there is currently evidence to show some patients will experience a range of symptoms for weeks to months after clinical recovery or discharge from isolation with damage to varied internal organs in a phenomenon termed "Long COVID" (Centers for Disease Control and Prevention, 2020).

Recent reports have suggested an oro-fecal transmission of the virus, in addition to the droplet-based and aerosol modes of transmission (CDC, 2019; Gao et al., 2020; Morawska & Milton, 2020; World Health Organization, 2020c). This may explain the other varying presentations of SARS-CoV-2 infection such as diarrhoea, loss of taste and smell, skin rash discolouration of fingers or toes, fatigue, hair loss, attention disorder, memory loss and sleep disorder. There is an overlap of the clinical manifestations of these conditions with those of respiratory illnesses which contribute to the symptom burden of the disease with the course and outcome of these signs and symptoms being largely unknown. There is also a general disorder of reduction of the innate immune response and progression from a pro-inflammatory status, to a hyperinflammatory state and then to adult respiratory distress syndrome (ARDS) (Huang et al., 2020; Potere et al., 2020), associated with increased mortality from heart failure or respiratory illness (Guan et al., 2020; Keeley et al., 2020). Many reports suggest COVID-19 infection is not limited to the respiratory system alone. Other systemic problems such as renal dysfunction, gastrointestinal complications, liver

dysfunction, cardiac manifestations such as arrhythmias and cardiomyopathies, mediastinal findings, neurological abnormalities and haematological manifestations such as venous thrombosis, myocardial infarction and stroke have also been noted (Behzad et al., 2020)

Despite the large numbers of people locally and globally who have suffered and recovered from an infection, the clinical course of the respiratory illness post-recovery in terms of the persistence of signs and symptoms, prevalence of the disease, as well as the impact on the general wellbeing and function, has not fully been elucidated. One study in Italy showed the persistence of symptoms with reduced quality of life in COVID-19 survivors up to 60 days following the onset of symptoms (Docherty et al., 2020). The mid- and long-term effects of an individual's general health and well-being, as well as their physical function and ability to return to work post COVID-19 infection has also not been fully described.

This study sought to examine the self-rated quality of life, physical function, and general health in Ghanaian patients following clinical recovery from COVID-19 infection.

1.1 Statement Of the Problem

SARS-CoV-2 caused by a novel coronavirus, is a worldwide pandemic with unprecedented public health consequences, posing challenges to food systems and the world of work. It affects all manner of persons (children, adults, and elderly) and has major impacts on an individual's medical, physical, economic, cognitive, social and mental health status (Lim et al., 2020; Simpson & Robinson, 2020), on their quality of life, health and well-being, with this impact being more pronounced in people with chronic health problems such as hypertension and diabetes (Samlani et al., 2020). As

of 15th May 2021, it had infected 162,561,793 people globally and resulted in a devastating 3,372,071 mortalities (Lucia et al., 2021). The dramatic loss of human lives worldwide as well as the devastating social and economic disruption caused by the pandemic has resulted in the potential for tens of millions of people becoming extremely poor and almost half of the entire world's workforce losing their livelihoods because of jobs being decimated or the individual losing their capacity to work (Chriscaden Kimberly, 2020).

Considering the fact that the disease has a multi-dimensional effect on various organs of the body and has also generated a plethora of psychiatric manifestations across the different strata of the society (Ijezie et al., 2021), the study seeks to explore the life conditions of patients i.e. their "Quality of life" after recovery from the illness as well as the coping strategies utilized over the period. The importance of disease outcomes in relation to the individual's social integration has been known to interfere with a person's quality of life (Behzad et al., 2020).

While there are a myriad of studies currently exploring all levels of prevention and management of SARS-CoV-2 in Ghana there is not much evidence of inquiry into the "Quality of Life" after recovery from this novel virus. Hospitalised patients are only reviewed to assess their medical status after they are discharged from the treatment centres. Since the disease is known to affect most internal organs in the body, the disease is bound to have an impact on the life of patients after being infected.

In Ghana there is a considerable gap in knowledge on the quality of life after Covid-19 infection and how individuals are coping and dealing with their situation after isolation or discharge from the treatment centre to their respective homes. This study thus seeks to explore the life conditions of patients when they get back into the community.

1.2 Justification Of the Study

COVID-19 is a novel disease. More is being discovered about this disease on a daily basis. There is sufficient evidence that COVID-19 is more than just a respiratory disease but also exhibits considerable systemic manifestations and effects. The medium to long term effects on the health and quality of life of post-COVID patients is still under investigation with very few studies being conducted globally.

In Africa, the COVID-19 outbreak appeared to be less severe compared to the state of the outbreak in Europe and the Americas. Particularly in Ghana, despite a slightly more severe second wave, the mortality has been relatively low with 780 deaths reported as of 30 April 2021, from 92,740 infections and 90,376 recoveries (Ghana Health Service, 2021). Negative long term health effects can result from the way individuals cope with stressors.

How this disease has impacted Ghanaian survivors with regards to the mid- to long-term effects on their health has not been reported and is yet to be investigated. In view of the scanty depth of knowledge with regards to the quality of life after COVID-19, it is necessary to explore this aspect of life of patients who were isolated or hospitalized in the COVID-19 treatment centre and their lives after recovery from the disease.

This study thus investigated the impact of COVID-19 on the quality of life of Ghanaian patients who have recovered from the disease. It provides important information and data on the state of health of these individuals following recovery and discharge from isolation as well as provides an understanding of the patterns and predictors of coping strategies utilized. Ultimately, the findings of this study will provide vital information that should guide policy on post-discharge care and follow-up after COVID-19 infection, rehabilitation, and social support systems, as well as inform guidelines on

Health Promotion to especially identify those individuals in most need of additional psychological support in pandemics.

1.3 Objectives Of the Study

1.3.1 General Objectives

To determine the Quality of life (QoL) and coping strategies of Covid-19 recovered patients at the Ghana Infectious Disease Centre.

1.3.2 Specific Objectives

1. To estimate the quality of life of COVID-19 recovered patients.
2. To determine the predictors of quality of life of COVID-19 recovered patients.
3. To identify the coping strategies utilized by COVID-19 recovered patients in Ghana.
4. To assess the association of socio-demographic characteristics on the coping strategies used by Covid-19 recovered patients.
5. To determine the association between quality of life and coping strategies employed by COVID-19 recovered patients.

1.3.3 Research Questions

1. What are the effects of Covid-19 on the quality of life of recovered patients?
2. What are the predictors of quality of life in COVID-19 recovered patients?
3. What types of coping strategies are being used by Covid-19 recovered patients in Ghana?
4. What are the associations of socio-demographic characteristics on the coping strategies used by COVID-19 recovered patients?

5. What is the relationship between quality of life and the coping strategies used by Covid-19 recovered patients?

1.4 Summary of Chapter

This chapter presented the background of the study, statement of the problem, justification of the study, the general and specific objectives of the study, and the research questions explored by this study.

2 LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.0 Introduction

This chapter discusses the existing literature pertaining to the topic being studied. It is sub-divided into seven sections. The first section provides literature on the background of COVID-19. The second section describes the literature on the progression of the disease. Section three provides literature on the extrapulmonary manifestations of the disease. Section four provides literature on studies on the persistence of symptoms and its effects on the quality of life of COVID-19 recovered patients. Section five provides literature on the coping strategies utilized by patients. Section six outlines the theoretical framework that guides this research. The seventh section describes the conceptual framework for this study.

2.1 Background

The world was struck with a huge public health threat at the end of 2019, the COVID-19 disease, which has since spread speedily and affected the lives of millions of people all over the globe. The novel virus is from the coronavirus family and was named Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) (CDC, 2020; ICM Anaesthesia COVID-19, 2020). It originated from Wuhan city, Hubei province, in China. On 30th January 2020, Covid-19 was declared by the World Health Organization as a public health emergency of international concern (PHEIC). Shortly afterwards on March 11th 2020, it was later declared a global pandemic, which has resulted in over 3million mortalities worldwide till date (CDC, 2020; Jan et al., 2021; WHO, 2020a). This declaration is the first after many years since the declaration of the H1NI influenza as a pandemic in 2009. It's capacity to spread to over 160 countries within a short time frame rendered it a highly contagious etiologic agent.

This viral disease is particularly of immense public health importance because it causes mortality in healthy adults, children, and the elderly with comorbidities (Gates, 2020). Although fewer cases have been reported in children as compared with adults, COVID-19 does cause infection in children who can then transmit the virus to susceptible adults. Mortality from COVID-19 is relatively higher than the typical seasonal influenza with a case fatality risk of 1%. Furthermore, it is transmitted rather efficiently and exponentially, with the infected person spreading the disease to averagely two or three others. It is also rapidly spread by people who are only mildly ill or pre-symptomatic (Hoehl et al., 2020). The disease has therefore challenged healthcare systems and provisions globally.

The first two confirmed cases in Ghana were recorded on 12th March 2020. Numbers of confirmed cases has since risen to 5,127 as of 13th May 2020 with 22 recorded deaths (Ghana Health Service, 2020). The worldwide figures however stood at 4.31 million infected people, with over 294,000 deaths. As of 3rd May 2021, Ghana had recorded a total of 92,683 positive cases with 779 deaths, whilst on the global front there had been 153,989,880 positive cases with 3,222,447 mortalities (Lucia et al., 2021) affecting at least 40 countries. This pandemic has forced many local reactions and has challenged the healthcare system at several fronts. Ghana implemented nationwide measures such as closure of National borders via land, air, and sea, the quarantine of infected persons, contact tracing, testing, and a three-week lock-down in Accra and Kumasi, which were identified as the epicentres of the spread of the virus (Afrane, 2021). Emphasis was placed on ensuring social distancing in public places such as markets and rigorous handwashing facilities (Veronica buckets) were mandatory before entry into businesses and shops. The numbers of persons allowed in public transportation vehicles (trotro) was also drastically reduced to ensure social distancing and wearing of facemasks was

made mandatory by law. The government of Ghana further implemented several social interventions and programs, and many Non-Governmental Organizations, religious bodies, private entities, and individuals also contributed to the fight with several donations and aids.

2.2 Disease Progression Of SARS-CoV-2

The SARS-CoV-2 entity which is distributed broadly in humans and other mammals, is an enveloped, non-segmented positive-sense RNA virus that is part of the subgenus sarbecovirus, orthocoronavirinae subfamily and was initially named the 2019-novel coronavirus (2019-nCoV) on 12 January, 2020 by the World health Organization (WHO) (Guo et al., 2020; Huang et al., 2020; Tahir ul Qamar et al., 2020). It is roughly 65-125nm in diameter with single stranded RNA and crown-like spikes on its outer surface. Being isolated from the respiratory epithelium from 3 bronchoalveolar lavage samples using a Polymerase Chain Reaction test (PCR), SARS-CoV-2 was noticed to share a homological sequence with two other members of the coronavirus family namely SARS-CoV and Middle-East Respiratory Syndrome Coronavirus (MERS-CoV) with the development of similar pathogenesis and manifestations (Bai et al., 2020; WHO, 2020c) but with a higher basic reproductive number than that of SARS-CoV which affected only 26 countries and resulted in approximately 8,000 deaths in 2003 (Bonful et al., 2020). SARS-CoV and MERS-CoV resulted in potentially fatal respiratory tract infections as well as pulmonary failure. Currently, it is reported that individuals who are infected produce copious amounts of the virus during the prodromal period in the upper respiratory airway tract, with subsequent affinity for the lower respiratory tract (Chan et al., 2020). As an infectious acute respiratory disease, it spreads primarily through the respiratory tract via respiratory droplets and secretions (Li et al., 2020).

According to the WHO, symptoms are non-specific and presentation ranges from asymptomatic to mild/ moderate disease to severe pneumonia or death (WHO, 2020c). There is a long prodromal stage with symptoms usually developing from 2 days to 14 days after exposure to the virus (CDC, 2021) with a mean incubation period of 5-6 days (WHO, 2020c). The inflammatory signs and symptoms are a result of elevated levels of pro-inflammatory cytokines and leukocytes (Rothan & Byrareddy, 2020; WHO, 2020c). Often referred to as a "cytokine storm". Symptoms include fever, chills or rigors, headache, muscle aches, fatigue, dry cough, chest pain, difficulty in breathing or shortness of breath, sore throat, nasal congestion, anosmia, ageusia, hair loss, attention disorder/ inability to focus (brain fog), memory loss, insomnia, abdominal pains, nausea, and vomiting (Garrigues et al., 2020). Most of these symptoms have been seen to persist weeks to months after the acute illness. COVID-19 has also been associated with several varying systematic manifestations (Cascella et al., 2020). In the elderly, and especially among those with comorbidities particularly diabetes and hypertension, the disease progresses into severe consequences or complications requiring hospitalization and later management in the Intensive Care Unit (ICU) usually from acute respiratory distress syndrome (ARDS), acute kidney and liver injury, cardiac injury, respiratory failure, stroke, and disseminated intravascular haemolysis (DIC) (Beeching & Fowler, 2020; CDC COVID-19 Response Team, 2020b; Rodriguez-Morales et al., 2020).

COVID-19 is highly transmissible, with human-to-human transmission of the virus occurring via small respiratory droplets when an individual comes into contact with an infected person's secretions expelled from the nose and mouth through coughing, sneezing, shaking hands, or through contact with fomites and subsequently touching the eyes, nose or mouth (WHO, 2020c; World Health Organization, 2020b) . The

unique features and mode of transmission of the virus has informed several preventive measures promoted to reduce the rate of the spread. Since its declaration by the World Health Organization (WHO) as a pandemic on Wednesday March 11th, there have been remarkable efforts worldwide in response to the virus. These include intensified disease surveillance and mitigation of community spread. Other notable responses have been the development of serological tests and treatment modalities, continuous research and the development of vaccines (Heymann & Shindo, 2020).

The virus has demonstrated to survive outside the host: up to 3 hours in air, for up to 4 hours on copper surfaces, for up to 24 hours on cardboard surfaces, and up to 72 hours on plastics and stainless steel (van Doremalen et al., 2020). The WHO's recommendation to reduce human-to-human transmission of the virus include regular washing of hands with soap under running water, limiting/avoiding physical contact between persons including handshakes, frequently rubbing hands using alcohol based hand sanitizers, coughing into the elbows or directly into tissue and immediately disposing it off, and limiting large gatherings (World Health Organization, 2020a). The COVID-19 virus has been shown in studies to be susceptible to extremely high temperatures of about 70 degrees Celsius hence warranting the use of steam inhalation in combating spread.

Detection and confirmation of SARS-CoV-2 is via a positive real-time reverse-transcriptase polymerase chain reaction (RT-PCR) test on nasopharyngeal or oropharyngeal swabs, and a radiological ground-glass opacification appearance on a chest computed tomography (chest CT) (Jan et al., 2021). Laboratory investigations usually reveal elevated inflammatory markers such as elevated d-dimers, C-reactive

proteins, lactate dehydrogenase, and ferritin levels. There may also be deranged liver function and renal function tests, leucocytosis, leukopenia, and lymphopenia.

There is no specific treatment of COVID-19. Symptoms usually resolve spontaneously. There have however been several documented cases of re-infection with SARS-CoV-2 worldwide with these cases exhibiting differing viral genomes, suggesting re-infection rather than a period of prolonged viral shedding (Goodman, 2021). Hydroxychloroquine, antiviral agents such as Remdisivir, as well as corticosteroids such as Methylprednisolone and Dexamethasone have been used in the management of COVID positive patients.

Vaccines were also developed over the period to vaccinate over 70% of the populace worldwide in order to provide herd immunity against the very dangerous virus which was causing high mortality rates. Ghana was the first African country to receive the first historic shipment of the 600,000 COVAX vaccines by Astra Zeneca on the 24th of February, 2021(World Health Organization, 2021) .

2.3 Extrapulmonary Manifestations

Being primarily a respiratory disease, pulmonary manifestation and substantial respiratory pathology constitutes the main presentation of the illness (Behzad et al., 2020). However, it is unfortunately not restricted to the respiratory system only. Many other organs are not spared and thus can be affected. Myocardial dysfunction, acute coronary syndrome, arrhythmias, acute kidney injury, renal dysfunction, gastrointestinal symptoms and complications, hepatocellular injury, liver dysfunction, endocrinological disorders, neurological abnormalities, ocular symptoms, dermatologic complications, and haematological manifestations are among the reported extrapulmonary features.

2.3.1 Renal Manifestation

Signs of kidney damage is observed in a significant proportion of patients with COVID-19 (Behzad et al., 2020). Clinical presentation includes proteinuria, haematuria, acute kidney injury (AKI), metabolic acidosis, clotting of extracorporeal circuits used for renal replacement therapy, and electrolyte abnormalities such as hyperkalaemia, hyponatremia, and hypernatremia.

2.3.2 Cardiovascular Manifestation

SARS-CoV-2 causes both direct and indirect cardiovascular sequelae (Behzad et al., 2020). Several cardiovascular presentations have been reported which includes arrhythmias such as new onset atrial fibrillation and atrial flutter, sinus tachycardia, sinus bradycardia, QT prolongation, which is often drug induced, torsade's de pointes, sudden cardiac arrest, pulseless electrical activity, myocarditis, myocardial ischaemia, myocardial infarction, acute cor-pulmonale, cardiomyopathy from biventricular, isolated right or left ventricular dysfunction and cardiogenic shock.

2.3.3 Gastrointestinal Manifestation

Gastrointestinal symptoms may be experienced by some patients with COVID-19. Symptoms may be linked to a longer duration of illness and an incidence of 12-16% (Cao et al., 2020; Mao et al., 2020; Pan et al., 2020; Redd et al., 2020; Wu et al., 2020). These include nausea, vomiting, diarrhoea, abdominal pain, anorexia, and rarely mesenteric ischaemia and gastrointestinal bleeding.

2.3.4 Hepatobiliary Manifestation

Patients with severe manifestations of COVID-19 may be observed to have signs of hepatobiliary damage (Behzad et al., 2020). Hepatocellular injury patterns are seen in

14-53% of critically ill patients (Arentz et al., 2020; Bhatraju et al., 2020; Eastin & Eastin, 2020; Wu et al., 2020; Zhou et al., 2020). This is associated with elevated levels of bilirubin, elevated hepatic transaminases/ aminotransferases, and low serum albumin levels.

2.3.5 Endocrine Manifestation

Patients suffering from pre-existing endocrine disease may be exposed to more severe clinical manifestations (CDC COVID-19 Response Team, 2020a). These include hyperglycaemia, diabetic ketoacidosis, and euglycemic ketosis. There is an increased risk of developing severe illness in patients with pre-existing diabetes or obesity.

2.3.6 Neurological Manifestation

Neurologic complications of COVID-19 include headache, dizziness, ageusia, anorexia, myalgia, and extreme fatigue. It has also been associated with cerebrovascular accidents/ stroke, encephalopathy, meningoencephalitis (Helms et al., 2020), Guillain-Barré syndrome (an acute inflammatory demyelinating polyneuropathy) (Frye et al., 2020; Zhao et al., 2020), acute haemorrhagic necrotizing encephalopathy, haemorrhagic posterior reversible encephalopathy syndrome (Franceschi et al., 2020), and psychosis.

2.3.7 Ophthalmologic Manifestation

Ocular manifestations such as conjunctivitis, conjunctival congestion and retinal changes have been reported in COVID-19 patients (Behzad et al., 2020).

2.3.8 Dermatological Manifestation

Cutaneous manifestations in COVID-19 include maculopapular rash, erythematous rashes, exanthematous rashes, vesicular lesions, urticaria, necrotic lesions, chickenpox-

like vesicles, and petechiae (Chesser et al., 2017; Gianotti et al., 2020; Joob & Wiwanitkit, 2020)

2.3.9 Haematological Manifestation

Laboratory abnormalities and thromboembolic complications seen with COVID-19 patients include thrombocytopaenia, neutrophilia, lymphopenia, leucocytosis, elevated erythrocyte sedimentation rate, elevated C-reactive protein, elevated ferritin, interteukin-6 and lactate dehydrogenase levels (Behzad et al., 2020). There are also elevated D-dimer and fibrinogen levels, prolonged prothrombin, and partial thromboplastin time. In terms of arterial thrombotic complications, there is an increase in myocardial infarction, ischaemic stroke, acute limb, and mesenteric ischaemia. For venous complications, there is an increased risk of deep venous thrombosis and pulmonary embolism. Another major complication is catheter related thrombosis in arterial and venous catheters as well as extracorporeal circuits. In a few instances Covid-19 patient's manifest symptoms of cytokine-release syndrome which include high grade fevers, hypotension, and multi-organ dysfunction.

2.4 Quality Of Life (QOL) And Persistence of Symptoms

Quality of life (QoL) by definition is the subjective judgement and self-reporting constructed by patients on their individual feelings of well-being to their physical, and social functioning, as well as to their occupational, spiritual, marital and sexual functioning, requiring a degree of cognitive ability (Chaturvedi & Muliyala, 2016).

Quality of life is a broad concept consisting of medical and psychological aspects which encompasses the standards of health, wealth, comfort, enjoyment, and happiness experienced by an individual or by groups of people including their daily activities,

psychological health, physical health status perception, instrumental activities, pain of perception, and their overall satisfaction with their lives (Chaturvedi & Muliyala, 2016). It is a measure of general well-being, the positive and negative features of life, and also a measure of a good life expected by an individual or the society. Values, goals, norms, and the socio-cultural contexts surrounding an individual's life guides these expectations. The World Health Organization (WHO) defines QoL as "an individual's perception of their position in life in the context of culture and value systems in which they live (WHOQoL Group, 1993)."

Recent focus has been on exploring the impact of physical and mental illness on quality of life (Bonomi et al., 2000). These psychosocial factors are now measured in addition to the usual biomedical factors to give a better outcome measure from both a clinician and patient perspective.

Quality of life has been said to be a difficult concept to measure or define due to its relative subjectivity. It is a multidimensional concept that looks at an individual's self-perception and current state of mind. The challenge then arises as to which domains should be considered in defining an individual's quality of life. Bonomi suggests that the most effective definition would include social, environmental, physical and psychological values. (Bonomi et al., 2000)

Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) mostly results in a favourable evolution of disease progression in patients (Taboada et al., 2021). However, a significant number of patients have poor outcomes, often progressing to Acute Respiratory Distress Syndrome (ARDS) thereby requiring management in an Intensive Care Unit (ICU). There is an increased susceptibility to the persistence of symptoms

and the development of poor health-related quality of life (HRQoL) in patients who survive.

A prospective study carried out by (Taboada et al., 2021) to evaluate the QoL, functional status and persistent symptoms of patients with COVID-19 induced Acute Respiratory Distress Syndrome (ARDS) at 6months post treatment in the ICU. A total of 91 survivors were used. At 6months after ICU discharge, a significant proportion of patients had worsened QoL (67%), persistent symptoms, reduction in the extent of functional status (63%), and persistent functional limitations (45%) compared to their pre-COVID status. Only 16% of the respondents had fully recovered. A limitation for the study was the use of critically ill patients in ICUs of hospitals in only one region.

Another study carried out by (Garrigues et al., 2020) on post discharge persistent symptoms and health-related QoL after hospitalization for COVID-19 revealed that most patients who required hospitalization still had persistent symptoms even after 110 days of discharge especially fatigue (55%) and dyspnoea (42%). Other symptoms noted were however loss of memory (34%), concentration disorder (28%), sleep disorder (30%), and hair loss (20%). Although the HRQoL was quite satisfactory, out of the 56 active workers pre-infection, only 69.1% had resumed work and amongst the 39 patients who had regular sports activity, only 71.8% had resumed physical activity with 46% having a lower level of physical activity.

(Lim et al., 2020) evaluated the impact of COVID-19 on HRQoL in a multi-ethnic Asian cohort with cardiovascular disease (CVD) in Singapore. Their study reported worsening of HRQoL during the COVID-19 outbreak. There was a significantly associated decline in the psychological health components especially anxiety and depression in patients with pre-existing CVD. A limitation to this study was the fact

that it was conducted in Asian patients with CVD hence may not be generalizable to other patient populations or ethnicities.

Further studies conducted by (Jacobs et al., 2020) on the persistence of symptoms and QoL at 35days post hospitalization for COVID-19 infection reported that 72.7% of their patients had persistent symptoms at day 35. Out of the 183 participants recruited, 52% were employed. At the time the study was conducted, only 29.9% of these cohort had resumed work whiles 73.7% had not on account of persistent symptoms. This study thus revealed that symptoms often persist beyond 35days of onset of infection, and this usually impairs the individual's ability to perform daily living activities, as well as impairs the QoL, health, mental social, and physical function.

A cross-sectional survey of a geographical cohort carried out by (Garratt et al., 2021) on non-hospitalized patients concluded that several important dimensions of HRQoL, including general health, social functioning, with role-limitations due to emotional problems and well-being, and aspects of mental health were lower than the general uninfected population norms 1.5 – 6 months after onset of COVID-19.

2.5 Coping Strategies

The effects of COVID-19 on what was previously considered 'normal life' has been considerable. With disruptions in daily activities, work, education, social interactions, worship, food and job security, and access to healthcare, it has led to what is now known as the 'new normal' where wearing of facemasks, social distancing, and limiting of social interactions through the restriction of social gatherings is now considered standard practice (Arora et al., 2020; Mennechet & Dzomo, 2020; Mertens et al., 2020). It has led to drastic measures being instituted by countries all over the world in a bid to contain the spread of the virus.

Varying actions taken by each country has resulted in varying degrees of success. Measures taken by different governments included a total or partial lockdown of the country's borders with restriction of movement within the country itself, closure of businesses, schools and churches, the mandatory washing of hands before entry into a public or private facility, as well as the compulsory wearing of facemasks and social distancing in public vehicles which were enforced with sanctions for culprits who disobeyed the orders. These control measures coupled with the rapid mortality rates has led to increasing emotions of fear and panic: fear of infection, fear of dying, and fear of losing a loved one. It has necessitated the development of certain strategies to cope with these stressors and this is bound to influence one's quality of life.

Psychologically, the COVID-19 pandemic has had immense negative impacts on our lives with consequences of stress, anxiety, and other mental health challenges (Asmundson & Taylor, 2020; Flesia et al., 2020; Kelvin & Rubino, 2020). This has been mostly due to the fear of the unknown, the rapid mode of transmission, the high morbidity and mortality rates, as well as the unavailability of a definitive mode of treatment. Necessary public health actions to reduce the spread of the disease such as social distancing and lockdown has led to loneliness and isolation with the propensity of increasing stress and anxiety.

In March 2020, a web-based survey conducted in 41 countries yielded very high levels of stress perceived among the 1091 respondents recruited (Limcaoco et al., 2020). A study conducted in China reported a 16.5% prevalence of severe depression, a 28.8% prevalence of severe anxiety, and an 8.1% prevalence of severe stress due to the impact of the pandemic among the general population (Wang et al., 2020). Additionally, a study conducted among Italians, reported perceived high levels of depression, stress

and anxiety (Flesia et al., 2020; Rossi et al., 2020). This is of considerable importance because of the psychological vulnerability it imposes on the general population resulting in numerous suicides reported in several countries due to the untoward pressures from the pandemic (Gunnell et al., 2020; Thakur & Jain, 2020). A nationwide study conducted in Bangladesh among 10,067 participants reported a 5% prevalence of suicidal ideation during the pandemic (Mamun et al., 2021).

Coping strategies have played an important role during the pandemic especially for people suffering from mental health issues as it may lead to either a positive or negative mental health outcome. Individuals use coping strategies consciously or unconsciously to solve problems through cognitive and behavioural efforts thereby reducing the stresses these problems cause (Algorani & Gupta, 2021). Utilizing coping strategies in a healthy way helps with the management of stressful situations, thereby reducing negative emotions and ultimately leading to resilience. Whereas unhealthy coping strategies results in severe stress and suicidal tendencies. There are 28 existing coping strategies (grouped into 14 paired subscales) which include denial, self-distraction, emotional support use, active coping, substance use, behavioural changes, planning, positive reframing, humour, acceptance, self-blame, religion, venting, and informational support use (Fluharty & Fancourt, 2021; Thai et al., 2021). These have been classified into two main categories: '*approach coping'* strategies and '*avoidant coping'* strategies.

Approach coping is an effective adaptive coping strategy which focuses on one's actions towards the stressor and is characterized by emotional support use, planning, informational support use, acceptance, positive reframing, and active coping to reduce stressors. Avoidant coping on the other hand manages stress less effectively with a

focus on efforts to avoid stressors and is characterized by denial, behavioural changes, self-blame, venting, and substance use. The remaining two strategies: religion and humour, do not belong in either category. Other categories that have been used to classify coping include *'emotional-focused'* strategies, and *'problem-focused'* strategies.

Research conducted in China during the COVID-19 outbreak in nurses and nursing college students on the coping strategies and emotional responses revealed a greater use of problem-focused strategies in both groups than that of emotion-focused strategies (Lei et al., 2020). Females were also found to use more of problem-focused strategies than males in this same study. Other studies have identified a variety of other predictors for the choice of coping style strategies some of which include lower socio-economic position, personality types, psycho-social factors, and socio-demographic factors.

The ways in which individuals deal with stressors can have long-term health implications (Busch et al., 2020). For instance, anxiety and depression typically result from avoidance coping strategies. Cognitive behavioural therapy has been shown to be the most effective therapy for targeting avoidance strategies and this focuses on cognitive reappraisal and problem-solving responses. Understanding the predictors and patterns of coping strategies used is therefore vital in the selection of treatment modalities and the identification of individuals in most need of additional psychological support.

2.6 Theoretical Framework

The Precede-Proceed model was used as the theoretical framework for this study. This model was proposed by Lawrence W. Green and Marshall W. Kreuter in 1974 to comprehensively assess health needs to design, implement, and evaluate health

promotion programs in meeting those needs (Crosby & Noar, 2011; Green & Kreuter, 2005). The model was used in conceptualizing this work by identifying the possible factors affecting quality of life post COVID-19 infection in order to investigate problems and suggest possible interventions or recommendations for improvement.

According to Green and Kreuter, the *PRECEDE* stands for predisposing, reinforcing, and enabling constructs in education/ecological diagnosis and evaluation and enables the planning of a focused and targeted public health program (Green & Kreuter, 2005). The *PROCEED* stands for policy, regulatory, and organizational constructs in educational and environmental development and enables the implementation and evaluation of public health programs.

The model begins with Phase 1: *'Social assessment'* characterized by identifying the desired outcome which is "Quality of life". Phase 2 is *'Epidemiological assessment'* which looks at the causes of poor quality of life which includes behavioural factors such as failure to comply with COVID-19 safety protocols, wearing of personal protective equipment's (PPE's), apathy towards the disease from failure to believe that the disease truly exists because they haven't been sick or haven't had a close friend or relative who has died from the disease, as well as using poor coping mechanisms. Phase 3 is the *'Educational and ecological assessment'* which looks at the predisposing factors which include age, sex, and comorbidities. Phase 4 looks at the *'Administrative and policy assessment and intervention alignment'* where the already existing policies are reviewed, and interventions are designed to achieve the desired outcome. This includes setting up of rehabilitative centres for the rehabilitation of patients who have suffered from COVID-19, a functional referral system for the swift referral of severe and critically ill patients, the setting up of post-COVID clinics for the management of

patients to detect any sequelae of COVID early, and the formation of a rapid response team to be deployed in public health emergencies for the training of health workers and the containment of disease.

Phase 5 is *'Implementation'* which is done through advocacy and mass public education using social media such as TV, radio, billboards, and social platforms. Education will also be done at the hospitals for both staff and patients. Mass community campaigns will also be done using floats and vehicles. Phase 6 is *'Process evaluation'* which is looking at the enabling and reinforcing factors which includes education of the public on the new measures that have been put in place, easy accessibility to treatment and rehabilitative centres, and affordability of services to encourage and increase patronage of services. Phase 7 is the *'Impact evaluation'* which looks at the impact of the interventions that have been instituted. Then finally Phase 8 which looks at the 'Outcome evaluation' which is the improved Quality of life.

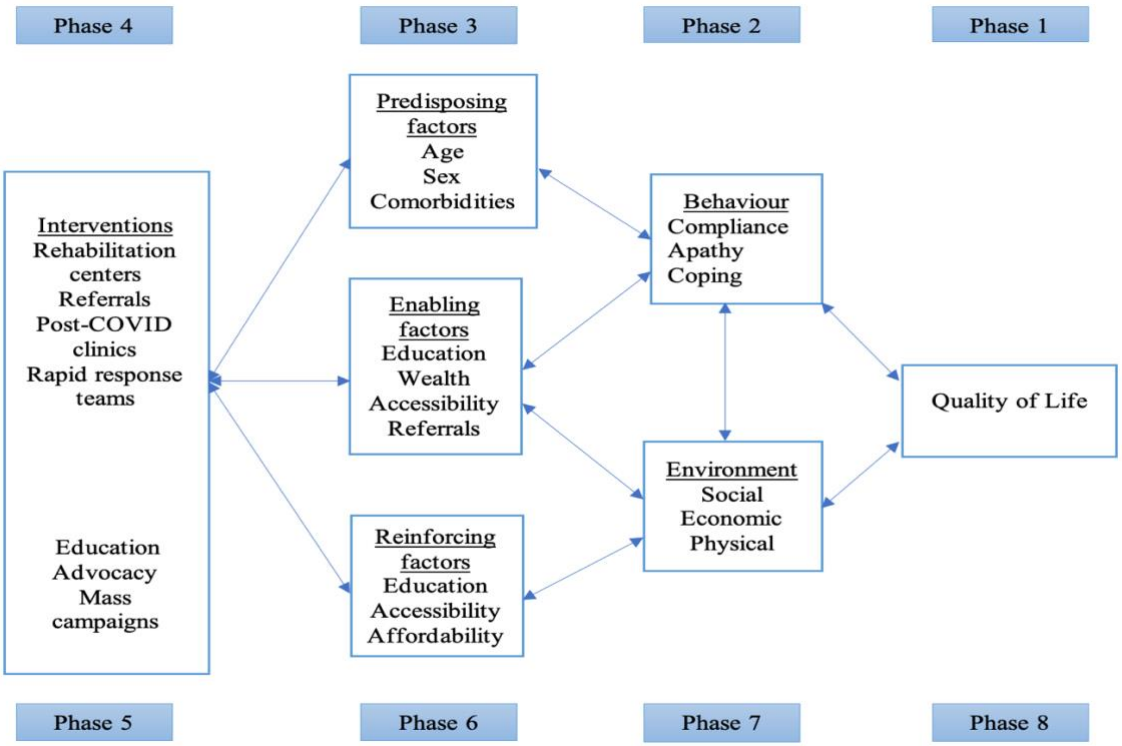


Figure 2.1:Theoretical framework of Quality of Life: An adaptation of the Precede-Proceed Model

2.7 Conceptual Framework

The conceptual model was adapted from the EQ-5D (EuroQol Group, 2021) and was modified to incorporate the variables under study. Though limited studies have been conducted on the novel SARS-CoV-2 disease, studies have shown an association between socio-demographic factors and the incidence COVID-19 (Karmakar et al., 2021; Peres et al., 2021). Significant evidence also exists in support of these socio-demographic factors such as age, sex, socio-economic status and presence comorbidities being associated with severe and critical illness thereby drastically increasing morbidity and mortality (Sohrabi et al., 2021) which inadvertently has an effect on the quality of life of patients who recover from the disease.

COVID-19 infection, persistence of symptoms and subsequent recovery has also been shown to be associated with the development of complications and the worsening of chronic comorbid states which has the propensity of affecting one's quality of life (Garratt et al., 2021; Garrigues et al., 2020). Fear of the unknown, the unpredictability of the symptomatology, as well as the devastating and rapid degree of morbidity and mortality worldwide poses severe psychological stress, anxiety and depression on patients, often leading to the adoption of coping strategies to deal with the stressors (Thai et al., 2021). The coping strategies utilized by patients may have positive or negative long-term health effects consequently affecting quality of life (Busch et al., 2020).

Growing evidence of the long-term complications of COVID-19 has warranted the need for rehabilitative services especially for patients with severe disease (WHO, 2020b; Yu & Helwig, 2021). This is bound to have an impact on the overall recovery and quality of life of COVID-19 recovered patients.

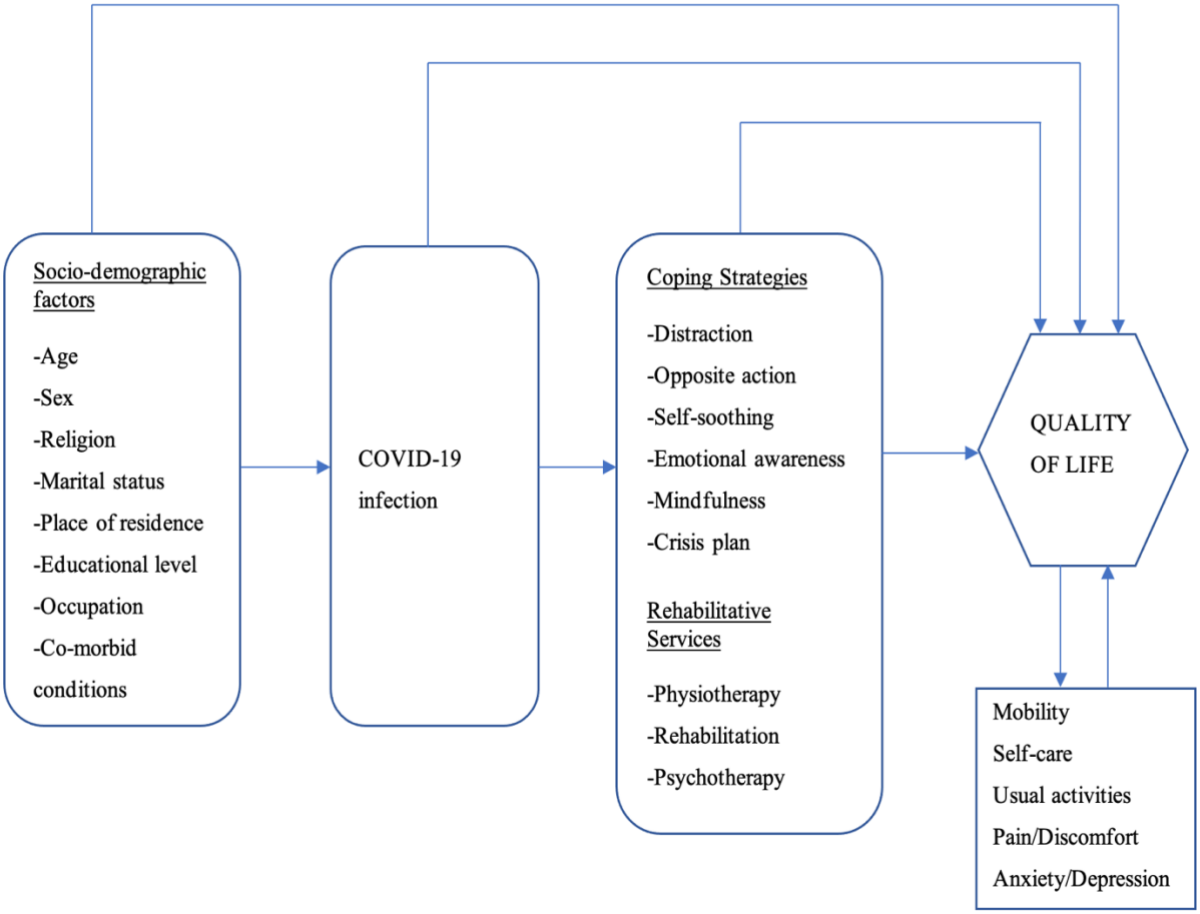


Figure 2.2: Conceptual Framework of Quality of Life

2.8 Summary of Chapter

The chapter has extensively reviewed the present literature available on COVID-19 with respect to its pathogenesis, clinical manifestation, disease progression and extrapulmonary manifestations. It also defined quality of life and described literature on the effects of COVID on health-related quality of life of survivors. It further defined coping strategies and described from literature the various types of coping strategies used worldwide because of the pandemic. Finally, it introduced the theoretical framework guiding this study and presented the conceptual framework.

3 METHODS

3.0 Introduction

This chapter explains the methods which were applied to collect data for subsequent analysis on the quality of life and coping strategies of COVID-19 recovered patients in order to answer the research objectives. This chapter describes the study design, knowledge paradigm, and study area. It also states the study population and describes the sampling technique, the sample size determination, and data collection tools that were used. It then finally outlines the ethical considerations that were observed.

3.1 Study Design

A cross-sectional and facility-based quantitative study was designed to assess the quality of life of COVID-19 recovered patients who attended the Ghana Infectious Disease Centre (GIDC) post-COVID-19 review clinic between August to October 2021. All COVID-19 recovered patients who attended the clinic during the study period, 18 years and above, were eligible to participate in the study. The clinical records of eligible participants were reviewed and data on patient's first COVID positive test, negative test, length of stay in hospital or isolation centre, and comorbidities was collected. Data on patient's sociodemographic characteristics, health status, persistence of symptoms, complications, and coping strategies were directly collected from the participants and a structured questionnaire was completed using both sources of data. A purposive non-probability sampling technique was used for sampling the participants. Data collected was analysed using STATA version 16.

3.2 Knowledge Paradigm

The knowledge paradigm utilized in this study was *POSITIVISM*.

The study sought to measure the impact of COVID-19 on the quality of life of patients who had recovered from the disease. It also sought to find out the single fact / reality out there utilizing a fixed design with a quantitative study approach. Knowledge was generated only by observation of facts and the data was analysed using these facts. In this study, the researcher had total control and influence over the subject of investigation and utilized impact evaluation as the research strategy which sought to identify the impact and effectiveness of existing policies on the participants quality of life. The research method was conducted through a survey and used a deductive research approach. Structured questionnaires with known variables were used as the research tool to collect the quantitative data on a large sample of participants.

3.3 Study Area

This research was carried out at the Ghana Infectious Disease Centre (GIDC) from August to October 2021. The Ghana Infectious Disease Centre is Ghana's first infectious disease centre with a 100-bed capacity which was built in response to the COVID-19 pandemic. The hospital was built in a record time of 100 days to provide needed healthcare services. The GIDC was developed to improve the medical diagnostic and research capacity of Ghana with respect to infectious diseases. It was built by the Ghana COVID-19 Private Sector Fund, which is a private sector-led initiative committed to providing prompt response to hardship and suffering caused by the COVID-19 pandemic.

A post-COVID clinic was set up in June 2020 but officially opened in January 2021. This is a follow up / review clinic for all patients who have had COVID and have been discharged to observe their progress after discharge from the facility. This clinic runs on weekdays (Mondays to Fridays) from 8am to 2pm. One consultation room is used,

and this is manned by 1 doctor and 2 nurses. An average of 5 patients are seen per day. Admission criteria for the clinic is any patient who has had a positive laboratory PCR test. Patients are booked for their first review two weeks after discharge from the COVID clinic. About 80% of patients who are hospitalized or isolated at Ga East Municipal Hospital or GIDC come back for review. Majority of patients have at least 2 to 3 reviews before they are discharged from the clinic. These reviews are done 2 weeks apart with patients spending at least 6 weeks at the clinic. Some have however spent up to a year at the review clinic. Patients are reviewed for the persistence of COVID symptoms (cardiovascular, respiratory, neurological), and management of a previously well-controlled co-morbid state which due to COVID has now become uncontrolled such as diabetes, and hypertension. There are 3 clinical psychologists who assess patients at each visit (especially those with persistent neurological deficits).

Discharge criteria from the clinic are when they are no longer symptomatic, when their blood pressure and glucose control is normalized, or when the proximity from their homes to the clinic is quite far hence regular visits is causing a financial burden in which case, they are transferred to a health facility or general clinic in closer proximity to them. As part of the patient's management, those who had critical-COVID as part of their rehabilitation undergo chest physiotherapy, or other forms of physiotherapy either at GIDC or are referred to physiotherapy units closer to their homes.

3.4 Study Population

The study population were all recovered patients (18years and above) from January 2021 to October 2021, attending the Ghana Infectious Disease Centre (GIDC) post-COVID-19 review clinic and who were able and willing to give informed consent to participate in the study.

3.4.1 Inclusion Criteria

1. Ghanaian adults (18years and above) with laboratory-confirmed diagnoses of COVID-19 who had recovered and were attending the review clinic.
2. Persons who are at least one month in the recovery period.
3. Persons who were willing and consented to be part of the study.

3.4.2 Exclusion Criteria

1. Presence of impairments to reasoning or mental disability such as dementia or Alzheimer's.
2. Immunocompromised individuals due to medical treatment such as cancer treatment patients.
3. Persons with illnesses that prevented them from taking part in the study such as stroke or delirium.
4. Persons who were not willing and did not consent to be part of the study.

3.5 Sample Size Determination

The GIDC post COVID clinic started officially operating from January 2021. Since its inception, it has averagely seen 5 patients per day from Mondays to Fridays. Over the period from January to June 2021, out of a total number of 782 patients that had been seen at the COVID clinic, 209 had been officially discharged to the post-COVID clinic following recovery. This was used to determine and calculate the minimum sample size using Yamane's simplified formula. A confidence level of 95% and P=0.05 was selected.

$$n = \frac{N}{[\,1 + N\,(e)^2\,]}$$

Where:

- n = Sample size
- *N* = Population size
- E = Precision level (Ajay & Micah, 2014)
- With a population size of 209 and a precision level of 5%, using Yamane's formula, the minimum sample size was estimated as 137 subjects. An attrition rate of 10% (13 patients) was considered and added making a total of 150 patients.

3.6 Sampling

A purposive sampling technique was applied to select the study participants. All recovered adult patients who attended the Ghana Infectious Disease Centre post-COVID-19 review clinic between January 2021 and October 2021 were recruited. Thus, data was collected at the review clinic from willing participants who were at least one month into the recovery period.

3.7 Variables

The variables of interest in this study were grouped into dependent and independent variables as explained below.

3.7.1 Dependent Variables

The dependent variables were quality of life and coping strategies as shown in Table 3.1.

Table 3.1: Details of dependent variables and Source of data

Type of variable	Variable	Operational definition	Scale of measurement
Dependent	Quality of Life	A subjective perception / judgement of an individual's general well-being.	Ratio
	Coping strategies	Strategies an individual consciously or unconsciously uses to solve problems through cognitive and behavioural efforts	Ordinal

3.7.2 Independent Variables

The independent variables of interest in the study were as follows:

- Patients' socio-demographic characteristics: such as age, sex, religion, ethnicity, level of education, marital status, occupation and area of residence.
- Other independent factors were comorbidities, development of complications, financial costs, treatment modality, persistence of symptoms, and access to rehabilitative services as shown in Table 3.2.

Table 3.2: Details of independent variables and Source of data

Type of variable	Variable	Operational definition	Scale of measurement
Independent variable	Age	Age at last birthday of participant in years	Ordinal
	Sex	Gender of participant	Binary (Nominal)
	Occupation	Occupation of participant	Nominal
	Educational level	Highest level of education attained by participant	Ordinal
	Religious affiliation	Religious group of participants	Nominal
	Ethnicity	Ethnic group affiliation of participants	Nominal
	Marital status	Marital status of participant	Nominal

Type of variable	Variable	Operational definition	Scale of measurement
	Area of residence	Area of residence of participants	Nominal
	Comorbidities	The presence of one or more chronic disease conditions	Nominal
	Complication	Secondary disease or condition aggravating an already existing one	Nominal
	Financial cost	Personal expenses incurred by participants	Binary (Nominal)
	Treatment modality	Type of treatment offered to participant	Binary (Nominal)
	Persistence of symptoms	Symptoms lasting more than 30days	Nominal
	Access to rehabilitative services	Access to functional rehabilitative services	Nominal

3.8 Data Collection and Tools

A structured questionnaire was developed and administered to study participants by the principal investigator with the assistance of one designated trained research assistant at the treatment centre. (See Appendix 2)

Section A of the questionnaire included questions on the study participants socio-demographic characteristics such as age, sex, ethnicity, educational level, religion, occupation/employment status, marital status, and religion.

Section B of the questionnaire included questions to ascertain the quality of life of study participants using the EuroQol Group Association five-domain, five level questionnaire (EQ-5D-5L), which is a widely used, worldwide validated questionnaire consisting of two sections: the descriptive system (EQ-5D-5L) and the visual analogue scale (EQ-VAS) (Bekairy et al., 2018; Hunger et al., 2012; Luo et al., 2017; Pinto et al., 2011).

The descriptive system provides a standardized measure of one's health status and assesses five domains (5D): mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Patients were asked to rate their health states in these 5 domains, with five possible response options which indicates the level of severity of the problem (no problems, slight problems, moderate problems, severe problems, or extreme problems). Value sets were then used to convert these five levels (5L) profile into a single index value. Ghana presently has no value sets available hence value sets for another African country, Zimbabwe, was used.

Section C of the questionnaire will solicit answers on the persistence of symptoms, comorbidities, worsening of comorbidities, post-COVID complications, and access to rehabilitative services, and how these influenced the study participants recovery process and quality of life post-COVID-19 infection. Clinical information on the dates of participant's positive COVID test and negative COVID test will be recorded from the patient's medical records.

Section D of the questionnaire will assess some of the coping strategies that were employed by participants during their recovery period from COVID using the Brief-COPE questionnaire as developed by Carver (Carver et al., 1989). This consists of 14 subscales comprising 2 items each, making a total of 28 coping strategies (28 different questions which depict a particular coping strategy). These are classified under three overarching styles of coping (Dias et al., 2012; Thai et al., 2021). The first strategy is '*Problem-Focused Coping'* (questions 2, 7, 10, 12, 14, 17, 23, 25) which includes Active Coping (2 & 7), Positive Reframing (12 & 17), Planning (14 & 25), and the Use of Informational Support (10 & 23). This is a positive outcome strategy which aims at changing the stressful event. The second strategy is '*Emotional-*

Focused Coping' (questions 5, 9, 13, 15, 18, 20, 21, 22, 24, 26, 27, 28) which includes the Use of Emotional Support (5 & 15), Acceptance (20 & 24), Humour (18 & 28), Self-Blame (13 & 26), Religion (22 & 27), and Venting (9 & 21). This has both positive and negative outcomes and aims at regulating emotions associated with stressors. The third strategy is *'Avoidant Coping'* (questions 1, 3, 4, 6, 8, 11, 16, 19) which includes Self-Distraction (1 & 19), Behavioural Disengagement (6 & 16), Substance Use (4 & 11), and Denial (3 & 8). This is a negative outcome strategy and is generally maladaptive and harmful to one's well-being. High scores are indicative of efforts to disengage physically or cognitively from the stressful situation whereas low scores indicate adaptive coping. Participants were asked to rate the degree to which they used each coping strategy to deal with the stressful event of COVID-19 during their recovery.

3.9 Safety Considerations

The questionnaires were administered in a quiet and secluded section of the GIDC affording the participant privacy. Informed consent was sought prior to filling the questionnaire and participants were reminded of the right to withdraw from the study at any point in time.

3.10 Data Analysis

3.10.1 Estimating the Quality of life

EQ-5D-5L

The EQ-5D-5L tool has 5 domains, each with 5 levels indicating quality of life in the respective domains (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression). EQ-5D-5L scores are originally from Likert scale domains (an

ordinal scale) which are then converted to a continuous composite score scale pre-determined by the developer of the tool (Euroqol Group, 1990; EuroQol Group, 2021). Each set of quality-of-life scores chosen constitute a value set that determines a person's overall quality of life based on comparisons with the value sets defined for Zimbabwe, which was used as a proxy for Ghana since it was the only African country with value sets and there are no value sets for Ghana.

A single index ranging from <0 to 1.00 was then calculated from the 5 levels using these value sets, with a value of 1.00 indicating "full health", 0 representing "death" and values <0 indicating "states worse than death" (Euroqol Group, 1990; EuroQol Group, 2021). This was converted to the percentage scale where 1.00 = 100% for easy comparison with EQ-VAS which is also on a percentage scale. The use of the EQ-5D-5L is meant to provide an objective measure of overall quality of life. In this study, the EQ-5D had good reliability with a Cronbach's alpha of 0.79.

EQ-VAS

Participants also reported their overall health status from their own perspective on a visual analogue scale (EQ-VAS) which is a scale ranging from 0 to 100, where 0 represented their "worst imaginable health" and 100 represented their "best imaginable health status". The use of the EQ-VAS is meant to provide a subjective measure of overall quality of life.

Scores from EQ-VAS (which is a subjective assessment) was used in comparison with scores from EQ-5D-5L (which is an objective measure) to determine if they were correlated.

3.10.2 Assessment of Coping Strategies

The Brief-COPE used in this study to assess coping strategies has been validated in several populations, has different language translations and has a good Cronbach's alpha of 0.87 (Garcia et al., 2018; Mohanraj et al., 2015; Peters et al., 2020) which was comparable to the Cronbach's alpha reliability coefficient in this study which was 0.82.

A 4-point Likert scale was used for rating coping strategies, and this ranged from 1 – "I haven't been doing this at all" to 4 – "I have been doing this a lot". The coping strategies were grouped into three broad themes and each theme further broken down into sub-themes made up of pairs of similar strategies (as described in section 3.8). The average scores for the paired coping strategies as well as for the three overarching sub-themes were computed and presented to indicate the degree to which study participants utilized each coping style.

3.10.3 Data Analysis

Data was entered into Microsoft Excel 2016, cleaned, and exported to Stata version 16 for statistical analysis.

Descriptive statistics were provided for all variables and presented in tables using frequencies and percentages for categorical variables and using means and standard deviations for continuous variables. Worsening of comorbidities was assessed using patient's clinical records where their first vitals recorded at the COVID clinic was taken as their baseline. Subsequent recordings that were taken at the post-COVID clinic were analysed to see trends / patterns using clinical judgement as a clinician. Worsening of comorbidities were reported as vital statistics which were abnormal and/or difficult to control (bring values to normal).

Analysis of variance was used to test for differences in means across categories of the socio-demographic factors, symptoms, comorbidities, complications, and treatment modalities. Linear regression was also used to determine factors associated with the outcome variables (Quality of life and Coping strategies). A level of significance was set at $p<0.05$. Factors that were statistically significant were fitted into an adjusted multiple linear regression model and presented in a table with 95% confidence intervals (CI). Spearman correlation was also used to establish the linear relationship between Quality of life and Coping strategies.

Graphs indicating the means and standard deviations were used to describe Quality of life scores and types of Coping strategies used.

Internal consistency of the tools used in measuring Quality of life and Coping strategies was assessed using the Cronbach's alpha.

3.11 Ethical Consideration

The following activities were undertaken to ensure compliance with the ethical issues underlying the study.

3.11.1 Quality Assurance and Pretesting

Each questionnaire was coded with a unique identification number. Pre-testing was done at the Korle -Bu COVID-19 treatment unit to assess feasibility of the study. Questionnaires were modified based on pre-testing results before final administration to study participants.

Questionnaires were checked manually to ascertain completeness and subsequently entered into Microsoft excel 2016. Data was cleaned and validated. Quality checks and

internal consistency checks were conducted to ensure validity and completeness of the data before analysis was done.

A medical doctor and a registered nurse at the Ghana Infectious Disease Centre (GIDC) received training and were provided with Standard Operation Procedures (SOPs) to follow before the field work. They were fluent in English, Twi and Ga and were monitored to ensure compliance with SOPS.

3.11.2 Ethical Clearance

The research proposal was submitted to the Ghana Health Service Ethics Review Committee to attain ethical approval to undertake the study (Approval ID: GHS – ERC 029/07/21). A permission letter was also provided by the School of Public Health to the Ghana Infectious Disease Centre (GIDC) for study site approval.

3.11.3 Risks and Benefits

Participants were not put at any physical risk. There were no immediate or direct benefits from participating in the study. Responses were however helpful in providing evidence for recommendations to appropriate authorities to help guide policies on post-discharge care and follow-up after COVID-19 infection, rehabilitation, and social support systems, as well as providing evidence to inform guidelines on Health Promotion.

3.11.4 Compensation / Payment

Payments were not given to participants in this study.

3.11.5 Right to Refuse

Participation was strictly voluntary.

3.11.6 Anonymity and Confidentiality

Participants provided information in privacy and were assured of confidentiality. Unique ID numbers were generated to identify participants of the study.

3.11.7 Participant's Consent

The purpose for which the study was being conducted was extensively explained to all participants in languages that they understood. Attached to each questionnaire was a participants information sheet and consent form which was administered to all study participants who agreed to participate in the research.

3.11.8 Data Storage, Security and Usage

Completed questionnaires were stored in cabinets under lock and key. Electronic files were encrypted, stored in a folder with a password, backed-up and only accessible to the principal investigator. Data will be deleted after 2 years of completion of the study.

3.12 Summary of Chapter

This chapter outlined the methods applied for data collection and analysis. A fixed methods design using a quantitative approach was used to assess the quality of life of COVID-19 recovered patients (18 years and above) at the Ghana Infectious Disease Centre (GIDC). The knowledge paradigm applied was positivism and the disciplines outlined in the research included epidemiology, political science, welfare economics, and public health. Sample size was determined using Yamane's formula and a purposive non-probability sampling technique was used to collect data. A survey was conducted using self-administered structured questionnaires. Data was entered into excel and exported to Stata for analysis. Internal consistency of the tools used in

measuring Quality of life and Coping strategies was assessed using the Cronbach's alpha. All due ethical considerations were observed.

4 RESULTS

4.0 Introduction

This chapter shows the results obtained from the study which is based on the analysed data. It is divided into six sections. The first section presents the frequencies and percentages of all independent variables used in this study (socio-demographic characteristics, persistent symptoms, comorbidities, complications, rehabilitation, and treatment factors). Section two presents information on the Quality of life of participants (EQ-5D-5L and EQ-VAS). The third section presents information on the predictors of Quality of life. The fourth section presents information on the types of coping strategies used. The fifth section presents information on the predictors of the styles of coping used. Section six presents information on the association between Quality of life and the Coping strategies used.

4.1 Characteristics Of Study Participants

4.1.1 Socio-demographic Characteristics of Respondents

The socio-demographic characteristics of participants are shown in Table 4.1. The mean age of respondents was 43.3 ± 14.8 years with most of them falling between the age group of 30-39years (35.3%). There were more females 82 (54.7%) than males, the dominant religion was Christianity (90%) and 46% were mostly Akan. Majority, (66%) of respondents were married, (94.7%) resided in urban areas, 83.3% had attained tertiary level education and 71.3% were formally employed. Although most of respondents were non – health workers (58.7%), out of the 41.3% who were health workers, doctors formed the majority constituting 72.6%.

Table 4.1: Socio-demographic characteristics of respondents (N = 150)

	N	%
Age (years), Mean=43.3, SD=14.8		
<30	21	14.0
30-39	53	35.3
40-49	30	20.0
50-59	23	15.3
60+	23	15.3
Sex		
Male	68	45.3
Female	82	54.7
Religion		
Christian	135	90.0
Muslim	8	5.3
Other	7	4.7
Ethnicity		
Ga-Dangme	32	21.3
Akan	69	46.0
Ewe	29	19.3
Northern tribe	12	8.0
Other	8	5.3
Marital status		
Single	33	22.0
Married	99	66.0
Separated/ Divorced	3	2.0
Widow(er)	15	10.0
Place of residence		
Urban	142	94.7
Non-urban	8	5.3
Educational level		
Primary	5	3.3
Secondary	11	7.3
Tertiary	125	83.3
Vocational/Technical	9	6.0
Occupation		
Student	3	2.0
Formally employed	107	71.3
Informally employed	23	15.3
Unemployed	8	5.3
Retired	9	6.0
Healthcare worker		
No	88	58.7
Yes	62	41.3
Specialty, if healthcare worker		
Doctor	45	72.6
Nurse	14	22.6
Other	3	4.8
Total	150	100.0

4.1.2 Persistent Symptoms and Treatment Characteristics of Respondents

Majority of respondents (52.7%) reported persistence of symptoms, with the most reported symptom being easy fatiguability constituting 63.3%, followed closely by headache (46.8%) then muscle ache (41.8%) as shown in Table 4.2. Abdominal pain, diarrhoea, nausea, and vomiting constituted only 2.5%. Sixty percent of respondents were not offered treatment or isolation services at their primary healthcare facility with three-quarters of respondents (75.3) undergoing self-isolation at home. Although 64.7% of medications were available at COVID-19 treatment facilities, 86% of respondents incurred personal financial costs with most of such costs resulting from medications (97.7%).

Table 4.2: Persistent symptoms and treatment characteristics of respondents (N = 150)

	N	%
Persistent symptoms (after 30 days)		
No	71	47.3
Yes	79	52.7
Symptoms (that persisted after 30 days) *		
Easy fatigue	50	63.3
Headache	37	46.8
Muscle ache	33	41.8
Extreme fatigue	29	36.7
Cough	24	30.4
Dyspnoea	18	22.8
Chest pain	17	21.5
Ageusia	17	21.5
Anosmia	15	19.0
Sleep disorder	13	16.5
Fever	6	7.6
Attention Disorder	4	5.1
Rigor	3	3.8
Memory loss	3	3.8
Abdominal pain	2	2.5
Nausea & Vomiting	2	2.5
Diarrhoea	2	2.5
Treatment or isolation services at Primary healthcare facility		
Not offered	90	60.0
Offered	60	40.0

**Multiple responses were required*

Table 4.2 (continued)

	N	%
Medications available at COVID-19 treatment facility		
Not all available	53	35.3
All available	97	64.7
Personal financial costs incurred		
No	21	14.0
Yes	129	86.0
Reason for incurred cost*		
Length of stay	4	3.1
Medications	126	97.7
Ventilatory support	1	0.8
Laboratory investigations	102	79.1
Treatment modality		
Hospital admission	37	24.7
Self-isolation at home	113	75.3
Total	150	100.0

**Multiple responses were required*

4.1.3 Comorbidities and Complications of Respondents

Majority of respondents (58%) had no comorbidities. Out of those that had comorbidities, majority (65.1%) were hypertensives whiles only one person had chronic kidney disease. Twenty – three percent of respondents reported worsening of comorbidities with hypertension constituting the most worsened comorbidity (68.6%) as shown in Table 4.3. Almost a quarter of the respondents also reported the development of complications (23.3%), with 17.1% reporting post-traumatic stress disorder as the major complication and only one person reported cerebro-vascular accident and viral cystitis.

Table 4.3: Comorbidities and complications of respondents (N = 150)

	N	%
Comorbidities prior to COVID-19 infection		
No	87	58.0
Yes	63	42.0
Comorbidities present (pre-COVID) *		
Diabetes	19	30.2
Sickle cell disease	2	3.2
Obesity	12	19.1
Chronic kidney disease	1	1.6
Hypertension	41	65.1
Asthma	8	12.7
Dyslipidaemia	10	15.9
Comorbidities worsening post-COVID		
No	115	76.7
Yes	35	23.3
Comorbidities worsened (difficult to manage) *		
Diabetes	14	40.0
Sickle cell disease	1	2.9
Chronic kidney disease	1	2.9
Dyslipidaemia	2	5.7
Hypertension	24	68.6
Asthma	3	8.6
Migraine	1	2.9
Complications post-COVID-19 infection		
No	115	76.7
Yes	35	23.3
Complications*		
Post-traumatic stress disorder	6	17.1
Pulmonary embolism	2	5.7
Difficulty mobilizing	4	11.4
Cerebro-vascular accident / Stroke	1	2.9
Deep vein thrombosis	3	8.6
Acute kidney injury	3	8.6
Total	150	100.0

**Multiple responses were required*

4.1.4 Rehabilitation Factors of Respondents

Majority of respondents (88%) were not offered rehabilitative services. Out of those that were offered rehabilitative services, 66.7% benefited from chest physiotherapy. Only nine reported having access to a rehabilitative centre and seven of them required psychotherapy as shown in Table 4.4.

Table 4.4: Rehabilitation factors of respondents (N = 150

	N	%
Rehabilitative services post-COVID		
Not offered	132	88.0
Offered	18	12.0
Services offered*		
Chest physiotherapy	12	66.7
Psychotherapy (Psychologist)	5	27.8
Limb physiotherapy	7	38.9
Access to rehabilitative centre		
No	141	94.0
Yes	9	6.0
Services rendered, if Yes*		
Chest physiotherapy	5	55.6
Psychotherapy (Psychologist)	7	77.8
Limb physiotherapy	6	66.7
Reason for lack of access, if No		
Not required	104	73.8
Not told	23	16.3
None-available	9	6.4
Too expensive	1	0.7
Too far away	2	1.4
Didn't know where to assess services	2	1.4
Total	150	100.0

**Multiple responses were required*

4.2 Quality of Life of Study Participants

Overall mean Quality of life measured on the EQ-5D-5L percentage scale was slightly higher (81.5 ± 12.0) % than the self-reported EQ-VAS (75.6 ± 22.0) % as shown in Figure 4.1, with a wider range of scores observed from the EQ-VAS.

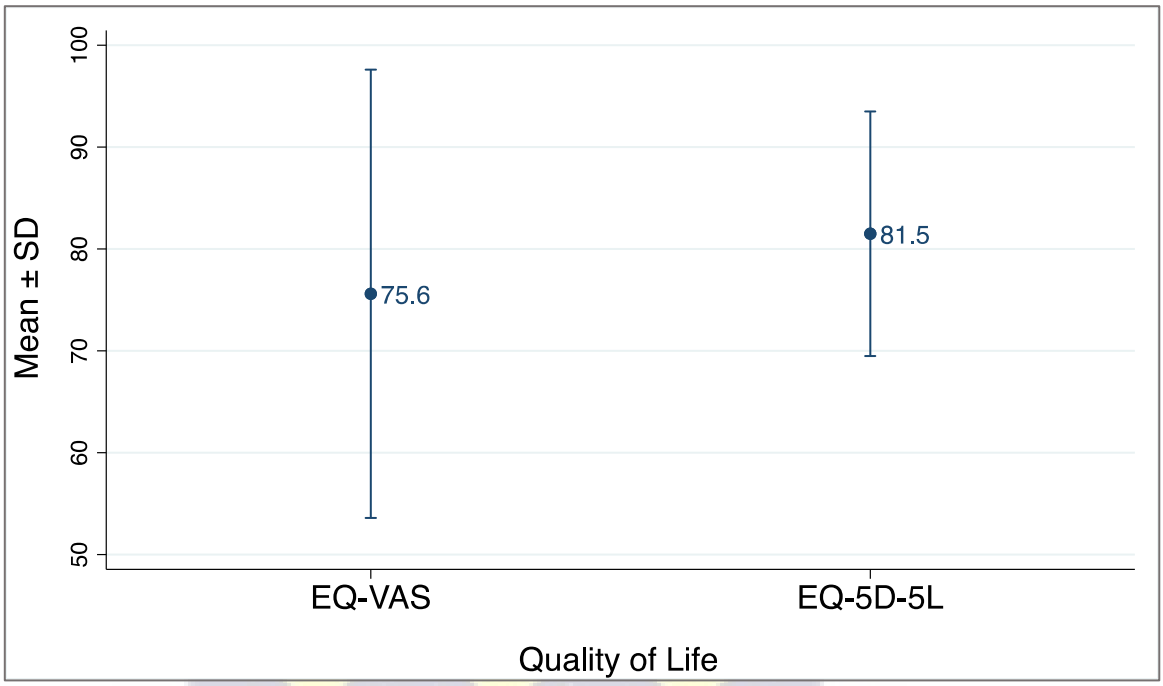


Figure 4.1: Quality of life

A larger proportion of participants suffered from mild to extreme symptoms of anxiety or depression (33.3%) followed closely by those who suffered varying degrees of pain or discomfort (32.7%) as shown in Table 4.5.

Table 4.5: Reported problems (mild to extreme) from EQ-5D-5L Questionnaire

	N = 150	%
Mobility: problems with walking around	39	26.0
Self-care: problems with washing or dishing	24	16.0
Usual activity: problems with usual activity	40	26.7
Pain or discomfort	49	32.7
Anxiety or depression	50	33.3

4.3 Predictors of Quality of Life

4.3.1 Quality of Life and Socio-demographic Characteristics

4.3.1.1 EQ-5D-5L

Unadjusted linear regression analysis of Quality of Life (EQ-5D-5L) % scores on socio-demographic characteristics showed significant reduction in quality of life for older participants by 0.15% for each additional year (p=0.023). There were significant differences in mean quality-of-life score (p=0.033) where those who had up to secondary education had a mean score 6.62% lower compared to those with primary education and those with vocational/technical education had a mean quality-of-life score 7.05% lower compared to those with primary education as shown in Table 4.6. There were also significant differences in mean quality-of-life score (p=0.032) for the specialty of healthcare workers where nurses had a mean score 8.13% lower than doctors and other healthcare workers (pharmacists and healthcare assistants) had a mean score 5.68% lower than doctors.

There were no significant differences in the mean quality-of-life EQ-5D-5L score across the other socio-demographic factors such sex, religion, ethnicity, marital status, place of residence, and occupation.

4.3.1.2 EQ-VAS

Unadjusted linear regression analysis of Quality of Life (EQ-VAS) % scores on socio-demographic characteristics showed significant reduction in mean quality of life score (p=0.029) for sex where females had a mean score of 7.84% lower than males. There were also significant differences in mean quality-of-life score (p=0.015) where those who had up to secondary education had a mean score 2.00% lower compared to those with primary education as shown in Table 4.6.

Significant differences in mean quality-of-life score (p=0.002) were also reported for the specialty of healthcare workers where nurses had a mean score 22.30% lower than doctors and other healthcare workers (pharmacists and healthcare assistants) had a mean score 4.80% lower than doctors.

There were no significant differences in the mean quality-of-life (EQ-VAS) score across the other socio-demographic factors such as age, religion, ethnicity, marital status, place of residence, and occupation.

Table 4.6: Unadjusted linear regression of Quality of Life (EQ-5D-5L and EQ-VAS) % scores on socio-demographic characteristics

	EQ-5D-5L (% scale)				EQ-VAS (% scale)			
	Unadjusted Coeff**	95% CI		P-value	Unadjusted Coeff**	95% CI		P-value
		Lower	Upper			Lower	Upper	
Age (years)	-0.15	-0.28	-0.02	**0.023**†	-0.18	-0.42	0.06	0.132
Sex				0.127				**0.029**†
Male	Ref				Ref			
Female	-3.00	-6.87	0.86		-7.84	-14.86	-0.81	
Religion				0.715				0.873
Christian	Ref				Ref			
Muslim	1.74	-6.91	10.39		-3.01	-18.90	12.87	
Other	3.44	-5.78	12.65		2.93	-13.99	19.86	
Ethnicity				0.807				0.355
Ga-Dangme	Ref				Ref			
Akan	0.80	-4.30	5.91		0.38	-8.89	9.65	
Ewe	-2.00	-8.12	4.12		-3.52	-14.63	7.59	
Northern tribe	-0.61	-8.69	7.47		-13.40	-28.07	1.28	
Other	2.97	-6.46	12.40		-2.31	-19.45	14.82	
Marital status				0.525				0.489
Single	Ref				Ref			
Married	-0.11	-4.88	4.66		6.66	-2.08	15.40	
Separated/ Divorced	1.59	-12.72	15.90		9.33	-16.89	35.56	
Widow(er)	-4.88	-12.26	2.51		3.67	-9.88	17.21	
Place of residence				0.571				0.193
Urban	Ref				Ref			
Non-urban	-2.48	-11.10	6.14		-10.42	-26.15	5.31	

† Statistically significant. **Coefficients implies the mean differences of the dependent variable per unit change of the predictors.

Table 4.6 (continued)

	EQ-5D-5L (% scale)				EQ-VAS (% scale)			
	Unadjusted Coeff**	95% CI Lower	95% CI Upper	P-value	Unadjusted Mean diff	95% CI Lower	95% CI Upper	P-value
Educational level				**0.**033†				**0.015**†
Primary	Ref				Ref			
Secondary	-6.62	-19.13	5.90		-2.00	-24.82	20.82	
Tertiary	1.65	-8.94	12.23		16.10	-3.20	35.40	
Vocational/Technical	-7.05	-19.99	5.90		5.78	-17.83	29.38	
Occupation				0.381				**0.027**†
Student	Ref				Ref			
Formally employed	-4.67	-18.52	9.17		7.96	-16.85	32.77	
Informally employed	-9.87	-24.39	4.65		-7.83	-33.84	18.19	
Unemployed	-5.14	-21.15	10.87		8.75	-19.94	37.44	
Retired	-5.53	-21.30	10.23		11.11	-17.14	39.37	
Healthcare worker				0.484				0.066
No	Ref				Ref			
Yes	1.40	-2.54	5.33		6.68	-0.46	13.82	
Specialty, if healthcare worker				**0.**032†				**0.002**†
Doctor	Ref				Ref			
Nurse	-8.13	-14.34	-1.93		-22.30	-34.01	-10.59	
Other	-5.68	-17.76	6.41		-4.80	-27.61	18.01	

† Statistically significant. **Coefficients implies the mean differences of the dependent variable per unit change of the predictors.

4.3.2 Quality of Life and Symptoms, Comorbidities, Complications, and Treatment

4.3.2.1 EQ-5D-5L

Unadjusted linear regression analysis of Quality of Life (EQ-5D-5L) % scores on symptoms showed significant differences in mean quality-of-life score ($p<0.001$) for participants who had persistent symptoms after 30days where their mean score was 11.94% lower compared to those who did not have such symptoms. The lowest reduction was seen in those who experienced ageusia, followed by those who experienced dyspnoea as shown in Table 4.7. Those who had comorbidities prior to COVID-19 infection had mean quality-of-life score 3.88% lower than those who did not have any comorbidities ($p=0.050$). There were significant differences in the mean score ($p=0.031$) where those who had worsening comorbidities post-COVID-19 infection had a mean score 4.99% lower compared to those whose comorbidities did not worsen. There were also significant differences ($p<0.001$) where those who had complications post-COVID had a mean quality-of-life score 11.43% lower than those who had no complications. Significant differences ($p=0.031$) were also seen in those who were offered rehabilitative services post-COVID, where the mean score was 6.49% lower for those who were offered rehabilitative services as compared to those who were not offered.

There were no significant differences seen in the mean quality-of-life EQ-5D-5L score for the type of treatment modality used, access to rehabilitative centres, and for participants who incurred personal financial costs.

4.3.2.2 EQ-VAS

Unadjusted linear regression analysis of Quality of Life (EQ-VAS) % scores on symptoms showed significant differences in mean quality-of-life score ($p<0.001$) for participants who had persistent symptoms after 30days where their mean score was 16.83% lower compared to those who did not have such symptoms. The lowest reduction was seen in those who experienced sleep disorder, followed by those who experienced chest pain and dyspnoea as shown in Table 4.7. Those who had comorbidities prior to COVID-19 infection had mean quality-of-life score 10.88% lower than those who did not have any comorbidities ($p=0.003$). There were significant differences ($p<0.001$) where those who had worsening comorbidities post-COVID-19 infection had a mean score 17.57% lower compared to those whose comorbidities did not worsen.

There were also significant differences ($p<0.001$) for participants who had complications post-COVID with a mean quality-of-life score 18.54% lower than those who had no complications. Respondents who had access to rehabilitative centres reported significant differences ($p=0.007$) with a mean score 20.16% lower compared to those who did not. Additionally, significant differences ($p=0.004$ and $p=0.001$) were reported for the treatment modality and being offered rehabilitative services respectively where those who were self-isolated at home had a 11.94% higher mean quality-of-life score than those on hospital admission, and those who were offered rehabilitative services post-COVID had a 6.83% higher mean score than those who were not offered such services.

There were no significant differences seen in the mean quality-of-life EQ-VAS score for participants who incurred personal financial costs.

Table 4.7: Unadjusted linear regression of Quality of Life (EQ-5D-5L and EQ-VAS) % scores on symptoms, comorbidities, complications, and treatment

	EQ-5D-5L (% scale)				EQ-VAS (% scale)			
	Unadjusted Coeff.	95% CI		P-value	Unadjusted Coeff.	95% CI		P-value
		Lower	Upper			Lower	Upper	
Persistent symptoms (after 30 days)				**<0.001†**				**<0.001†**
No	Ref				Ref			
Yes	-11.94	-15.30	-8.57		-16.83	-23.41	-23.41	
Symptoms (that persisted after 30 days) *								
Headache								
Muscle ache	-13.67	-17.58	-9.76	**<0.001†**	-19.43	-27.05	-11.81	**<0.001†**
Cough	-13.54	-17.67	-9.41	**<0.001†**	-21.96	-29.77	-14.15	**<0.001†**
Chest pain	-10.31	-15.32	-5.29	**<0.001†**	-24.29	-33.15	-15.43	**<0.001†**
Ageusia	-9.84	-15.74	-3.93	**<0.001†**	-28.89	-39.07	-18.70	**<0.001†**
Anosmia	-16.90	-22.37	-11.44	**<0.001†**	-18.27	-29.09	-7.46	**0.001†**
Extreme fatigue	-13.54	-19.62	-7.46	**<0.001†**	-16.90	-28.43	-5.37	**0.004†**
Dyspnoea	-13.72	-18.09	-9.34	**<0.001†**	-9.63	-20.97	1.72	**<0.001†**
Easy fatigue	-15.21	-20.64	-9.78	**<0.001†**	-26.27	-36.34	-16.19	**<0.001†**
Sleep disorder	-11.61	-15.26	-7.96	**<0.001†**	-17.75	-24.72	-10.78	**<0.001†**
	-12.07	-18.67	-5.46	**<0.001†**	-33.10	-44.53	-21.66	**<0.001†**
Comorbidities prior to COVID-19 infection				0.050				**0.003†**
No	Ref				Ref			
Yes	-3.88	-7.75	0.00		-10.88	-17.87	-3.90	
Comorbidities worsening post-COVID				**0.031†**				**<0.001†**
No	Ref				Ref			
Yes	-4.99	-9.50	-0.48		-17.57	-25.48	-9.66	
Complications post-COVID-19 infection				**<0.001†**				**<0.001†**
No	Ref				Ref			
Yes	-11.43	-15.62	-7.24		-18.54	-26.39	-10.69	

*Multiple responses were required. †Statistically significant. **Coefficients implies the mean differences of the dependent variable per unit change of the predictors

Table 4.7 (continued)

	EQ-5D-5L (% scale)				EQ-VAS (% scale)			
	Unadjusted Coeff.	95% CI		P-value	Unadjusted Coeff.	95% CI		P-value
		Lower	Upper			Lower	Upper	
Personal financial costs incurred				0.721				0.266
No	Ref				Ref			
Yes	-1.01	-6.59	4.58		-5.77	-15.97	4.44	
Treatment modality				0.054				**0.004†**
Hospital admission	Ref				Ref			
Self-isolation at home	4.36	-0.08	8.80		11.94	3.92	19.95	
Rehabilitative services post-COVID				**0.031†**				**0.001†**
Not offered	Ref				Ref			
Offered	-6.49	-12.36	-0.62		6.83	-2.02	15.68	
Access to rehabilitative centre				0.057				**0.007†**
No	Ref				Ref			
Yes	-7.84	-15.90	0.22		-20.16	-34.77	-5.55	

*Multiple responses were required. †Statistically significant. **Coefficients implies the mean differences of the dependent variable per unit change of the predictors

4.3.3 Factors Influencing Quality of Life among respondents

4.3.3.1 EQ-5D-5L.

Adjusted linear regression analysis of factors influencing Quality of Life (EQ-5D-5L) % scores among respondents showed significant differences in mean quality-of-life score ($p<0.001$) for participants who had persistent symptoms after 30days where their mean score was 9.18% lower compared to those who did not have such symptoms. Significant differences ($p=0.008$) were seen in participants who had complications with a mean score of 6.62 lower compared to those who didn't have after controlling for the other factors in the model shown in Table 4.8.

There were no significant differences in adjusted mean quality-of-life EQ-5D-5L scores across age, educational level, comorbidities, treatment modality, offering of- and access to- rehabilitative services.

After the multivariate analysis only persistent symptoms after 30 days and complications post-COVID-19 infection remained significant independent predictors of quality of life, thereby confounding other factors previously thought significant predictors.

4.3.3.2 EQ-VAS

Adjusted linear regression analysis of factors influencing Quality of Life (EQ-VAS) % scores among respondents showed significant differences in mean quality-of-life score ($p=0.047$) for sex, where females reported a mean quality-of-life score 6.50% lower than males. There were also significant differences ($p=0.020$) for participants who had persistent symptoms after 30days where their mean score was 8.62% lower compared

to those who did not have such symptoms after controlling for the other factors in the model shown in Table 4.8. Respondents who reported having worsening comorbidities also showed significant differences (p=0.035) with a mean quality-of-life score 11.55% lower than those who did not have worsening comorbidities. Participants who reported complications post-COVID had significant differences (p=0.026) with a mean score of 10.50% lower compared to those who didn't have complications.

There were no significant differences in adjusted mean quality-of-life EQ-VAS scores across age, educational level, occupation, comorbidities prior to COVID-19 infection, for the treatment modality, being offered and having access to rehabilitative services.

After the multivariate analysis only sex, persistent symptoms after 30 days, complications post-COVID-19 infection, and comorbidities worsening post-COVID remained significant independent predictors of quality of life, thereby confounding other factors previously thought significant predictors.

Table 4.8: Adjusted linear regression of factors influencing Quality of Life (EQ-5D-5L and EQ-VAS) % scores among respondents

	EQ-5D-5L (% scale)				EQ-VAS (% scale)			
	Adjusted Coeff.	95% CI		P-value	Adjusted Coeff.	95% CI		P-value
		Lower	Upper			Lower	Upper	
Age (years)	-0.02	-0.17	0.12	0.759	0.14	-0.19	0.47	0.403
Sex								**0.047**†
Male	--	--	--		Ref			
Female	--	--	--		-6.50	-12.90	-0.10	
Educational level				0.309				0.543
Primary	Ref				Ref			
Secondary	-6.04	-17.34	5.25		-2.35	-24.09	19.39	
Tertiary	-0.79	-10.53	8.95		7.47	-12.64	27.59	
Vocational/Technical	-5.28	-17.01	6.45		2.23	-20.18	24.63	
Occupation								0.444
Student	--	--	--		Ref			
Formally employed	--	--	--		6.50	-16.73	29.72	
Informally employed	--	--	--		0.66	-23.98	25.31	
Unemployed	--	--	--		10.21	-17.97	38.40	
Retired	--	--	--		17.02	-12.53	46.57	
Persistent symptoms (after 30 days)				**<0.001**†				**0.020**†
No	Ref				Ref			
Yes	-9.18	-13.03	-5.33		-8.62	-15.85	-1.38	
Comorbidities prior to COVID-19 infection				0.917				0.904
No	Ref				Ref			
Yes	-0.24	-4.70	4.23		-0.52	-9.09	8.04	
Comorbidities worsening post-COVID				0.726				**0.035**†
No	Ref				Ref			
Yes	-0.99	-6.58	4.60		-11.55	-22.24	-0.85	
Complications post-COVID-19 infection				**0.008**†				**0.026**†
No	Ref				Ref			
Yes	-6.62	-11.52	-1.73		-10.50	-19.70	-1.30	

† Statistically significant. Variables with blanks were excluded from the model. **Coeff. implies the mean differences of the dependent variable per unit change of the predictors

Table 4.8 (continued)

	EQ-5D-5L (% scale)				EQ-VAS (% scale)			
	Adjusted Coeff.	95% CI		P-value	Adjusted Coeff	95% CI		P-value
		Lower	Upper			Lower	Upper	
Treatment modality				0.331				0.808
Hospital admission	Ref				Ref			
Self-isolation at home	-2.45	-7.41	2.52		1.14	-8.07	10.34	
Rehabilitative services post-COVID				0.914				0.285
Not offered	Ref				Ref			
Offered	-0.40	-7.75	6.94		-7.41	-21.07	6.24	
Access to rehabilitative centre				0.982				0.705
No	Ref				Ref			
Yes	0.11	-9.88	10.10		3.55	-15.00	22.11	

† Statistically significant. Variables with blanks were excluded from the model. **Coefficients implies the mean differences of the dependent variable per unit change of the predictors

4.4 Coping Strategies Used by Study Participants

The highest coping strategy used by participants was problem-focused coping with a mean of 2.71 ± 0.64 SD on a scale 1 (no use at all) to 4 (used a lot). This was followed by emotional-focused coping with a mean of 2.32 ± 0.43 SD and lastly avoidant coping with a mean of 1.57 ± 0.39 SD as seen in Figure 4.2.

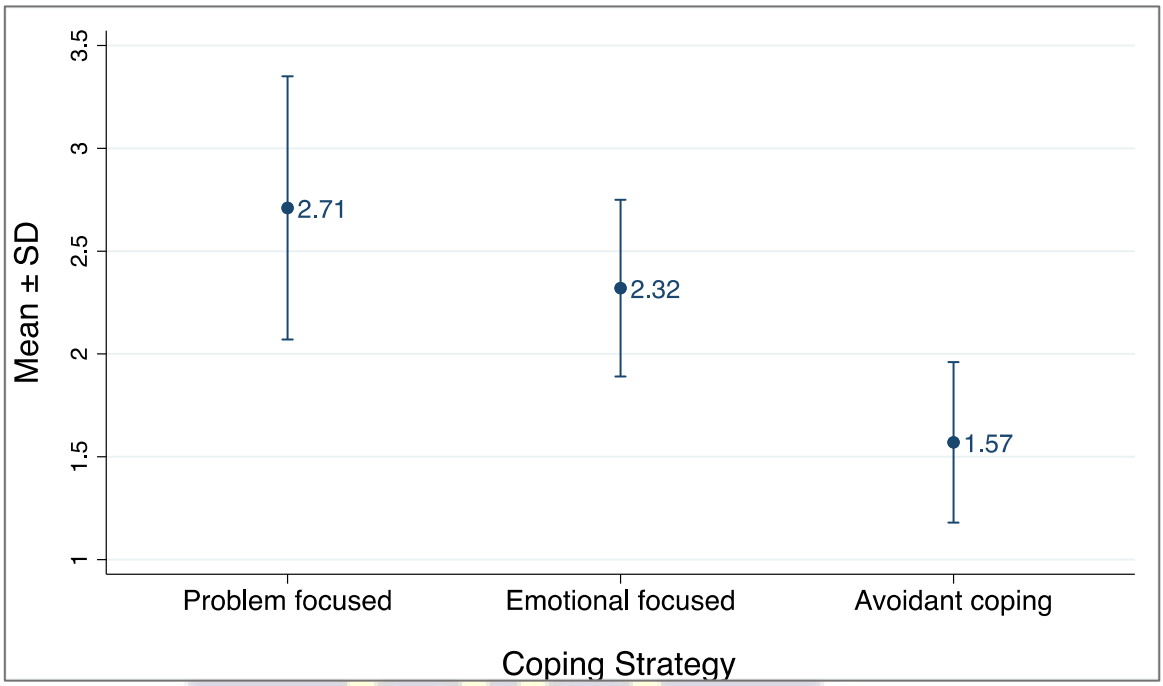


Figure 4.2: Overall Coping Strategy

4.4.1 Problem-focused Coping

With Problem-focused coping, majority of respondents reported the use of informational support as their predominant coping style with a mean of 3.07 ± 0.98 SD. The least used was positive reframing with a mean of 2.23 ± 1.00 SD as shown in Figure 4.3.

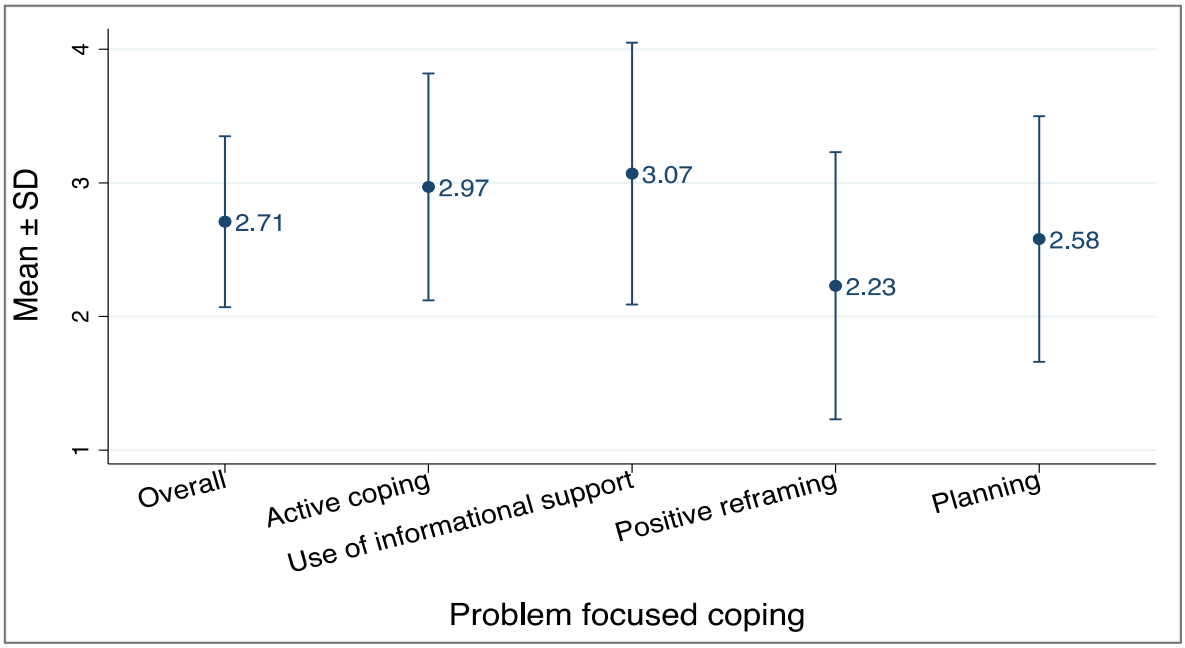


Figure 4.3: Problem-focused coping strategy

4.4.2 Emotional-focused Coping

With Emotional-focused coping strategy, majority of respondents utilised emotional support as their main coping style with a mean of 3.20 ± 0.89 SD. the least used style of coping was self-blame with a mean of 1.41 ± 0.67 SD as shown in Figure 4.4.

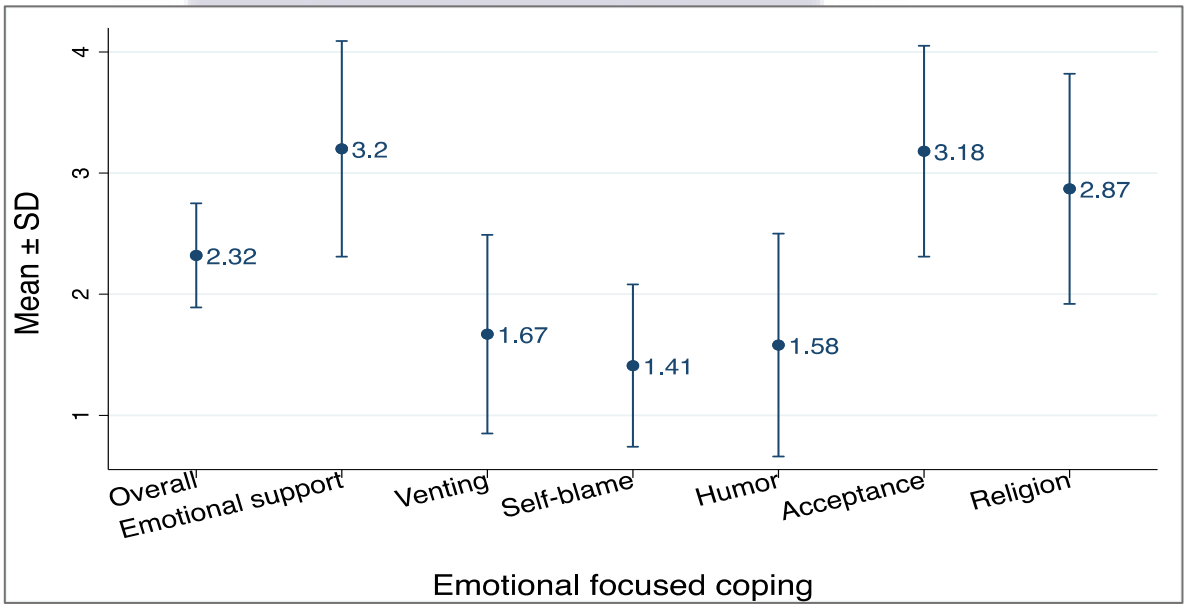


Figure 4.4: Emotional-focused coping strategy

4.4.3 Avoidant Coping

With Avoidant coping, the most used coping style was self-distraction with a mean of 2.57 ± 1.03 SD and the least reported style of coping was substance use with a mean of 1.05 ± 0.20 SD as shown in Figure 4.5.

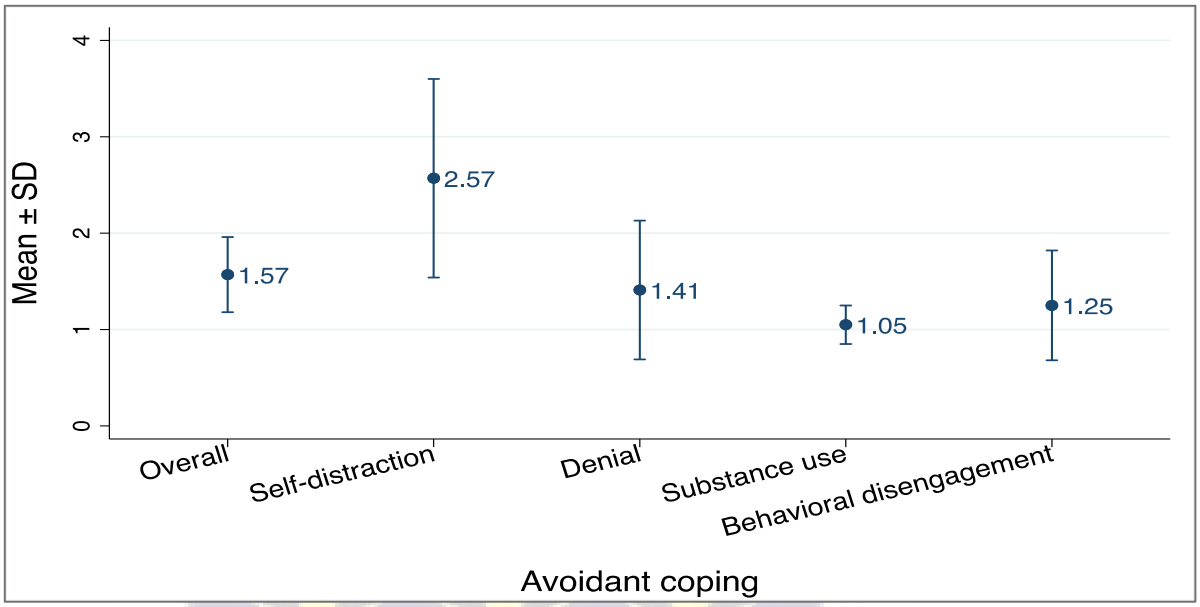


Figure 4.5: Avoidant coping strategy

4.5 Predictors of Coping Styles Used by Study Participants

4.5.1 Socio-demographic Characteristics and Coping Strategies

Significant differences in mean avoidant coping scores were observed across age categories (p=0.011) where the highest score was observed among those aged 40-49 years and the least among those aged 30-39 years as seen in Table 4.9. There were also significant differences in avoidant coping scores (P=0.004) as well as problem-focused coping scores (P=0.013) among healthcare worker profession where higher scores were observed for non-healthcare workers for both types of coping styles. There were no

significant differences observed for the other socio-demographic characteristics (sex, religion, ethnicity, marital status, place of residence and occupation) across all three coping strategy styles.

Table 4.9: Socio-demographic characteristics and Coping strategies

	Avoidant coping			Problem-focused			Emotional-focused		
	Mean	SD	P-value	Mean	SD	P-value	Mean	SD	P-value
Age (years)			**0.011**†			0.618			0.623
<30	1.63	0.39		2.55	0.56		2.33	0.35	
30-39	1.43	0.28		2.69	0.67		2.33	0.41	
40-49	1.70	0.43		2.76	0.63		2.37	0.47	
50-59	1.68	0.39		2.85	0.69		2.35	0.50	
60+	1.55	0.44		2.70	0.63		2.19	0.46	
Sex			0.117			0.394			0.094
Male	1.52	0.39		2.66	0.65		2.25	0.39	
Female	1.62	0.38		2.75	0.64		2.37	0.46	
Religion			0.750			0.815			0.208
Christian	1.56	0.38		2.70	0.65		2.32	0.44	
Muslim	1.67	0.55		2.84	0.64		2.48	0.29	
Other	1.57	0.26		2.75	0.49		2.08	0.35	
Ethnicity			0.337			0.717			0.233
Ga-Dangme	1.50	0.27		2.81	0.67		2.26	0.51	
Akan	1.61	0.39		2.73	0.64		2.38	0.40	
Ewe	1.49	0.33		2.58	0.62		2.18	0.46	
Northern tribe	1.67	0.64		2.69	0.58		2.40	0.34	
Other	1.69	0.41		2.64	0.81		2.40	0.41	
Marital status			0.560			0.183			0.324
Single	1.57	0.35		2.75	0.61		2.37	0.31	
Married	1.57	0.39		2.69	0.64		2.31	0.46	
Separated/ Divorced	1.88	0.76		3.46	0.52		2.64	0.57	
Widow(er)	1.53	0.36		2.59	0.71		2.19	0.43	
Place of residence			0.956			0.337			0.917
Urban	1.57	0.38		2.70	0.65		2.32	0.44	
Non-urban	1.58	0.45		2.92	0.53		2.30	0.27	
Educational level			0.136			0.689			0.424
Primary	1.85	0.32		2.93	0.83		2.22	0.73	
Secondary	1.50	0.46		2.83	0.80		2.42	0.42	
Tertiary	1.55	0.36		2.70	0.64		2.30	0.43	
Vocational/Technical	1.76	0.61		2.56	0.43		2.51	0.34	
Occupation			0.213			0.469			0.478
Student	1.75	0.13		2.58	0.63		2.28	0.32	
Formally employed	1.53	0.34		2.68	0.63		2.32	0.45	
Informally employed	1.67	0.53		2.92	0.68		2.43	0.38	
Unemployed	1.78	0.34		2.50	0.65		2.14	0.53	
Retired	1.58	0.47		2.71	0.75		2.21	0.36	
Healthcare worker			**0.004**†			**0.013**†			0.648
No	1.65	0.39		2.82	0.61		2.33	0.42	
Yes	1.46	0.36		2.55	0.66		2.30	0.46	
Overall	1.57	0.39		2.71	0.64		2.32	0.43	

† Statistically significant

4.5.2 COVID-19 Related Characteristics and Coping Strategies

Significant differences were observed in both avoidant coping (P<0.000) and problem-focused coping (P=0.037) scores for participants who developed complications post-COVID-19 infection where they scored higher than those who did not develop any complications as seen in Table 4.10. Participants who had persistent symptoms after 30 days were also observed to have higher scores than those who didn't have with significant differences being observed for emotional-focused coping scores (P=0.031). No significant differences were observed for the other COVID-19 related characteristics (prior comorbidities and worsening comorbidities) across all three coping styles.

Table 4.10: COVID-19 related characteristics and Coping strategies

	Avoidant coping			Problem-focused			Emotional-focused		
	Mean	SD	P-value	Mean	SD	P-value	Mean	SD	P-value
Persistent symptoms (after 30 days)			0.135			0.242			**0.031**†
No	1.52	0.30		2.64	0.68		2.24	0.47	
Yes	1.62	0.45		2.77	0.61		2.39	0.39	
Comorbidities prior to COVID-19 infection			0.233			0.710			0.869
No	1.54	0.34		2.69	0.64		2.32	0.43	
Yes	1.62	0.43		2.73	0.64		2.31	0.44	
Comorbidities worsening post-COVID			0.051			0.589			0.840
No	1.54	0.34		2.69	0.66		2.32	0.42	
Yes	1.68	0.49		2.76	0.60		2.30	0.47	
Complications post-COVID-19 infection			**<0.000**†			**0.037**†			0.061
No	1.51	0.33		2.65	0.63		2.28	0.44	
Yes	1.78	0.47		2.91	0.63		2.44	0.41	
Overall	1.57	0.39		2.71	0.64		2.32	0.43	

† Statistically significant

4.6 Association Between Quality of Life and Coping Strategies

From the Spearman correlation analysis, higher quality of life EQ-5D-5L scores were significantly associated with lower use of positive reframing, venting, religion, and behavioural disengagement coping strategies as seen in Table 4.11. Higher quality of life EQ-VAS scores was also significantly associated with lower use of informational support, venting, and behavioural disengagement coping strategies. Overall, lower use of emotional-focused coping strategies was significantly associated with higher EQ-5D-5L quality of life whiles higher EQ-VAS quality of life was significantly associated with lower use of both problem-focused and avoidant coping strategies. An increase in the use of active coping, humour, self-distraction, and substance use were however associated with higher EQ-5D-5L quality of life whiles an increase in the use of humour and acceptance was associated with higher EQ-VAS quality of life but these were all not statistically significant.

Table 4.11: Coping strategies and Quality of life

	EQ-5D-5L		EQ-VAS	
	Rho	P-value	Rho	P-value
Problem-focused	-0.154	0.059	-0.167	**0.042**†
Active coping	0.098	0.235	-0.021	0.802
Use of informational support	-0.062	0.455	-0.203	**0.013**†
Positive reframing	-0.279	**0.001**†	-0.102	0.214
Planning	-0.151	0.065	-0.134	0.101
Emotional-focused	-0.243	**0.003**†	-0.100	0.223
Emotional support	-0.024	0.771	-0.100	0.224
Venting	-0.419	**0.000**†	-0.245	**0.003**†
Self-blame	-0.074	0.371	-0.115	0.162
Humour	0.008	0.921	0.123	0.134
Acceptance	-0.049	0.552	0.067	0.415
Religion	-0.166	**0.042**†	-0.091	0.268
Avoidant coping	-0.042	0.606	-0.228	**0.005**†
Self-distraction	0.108	0.188	-0.060	0.466
Denial	-0.038	0.645	-0.142	0.083
Substance use	0.105	0.199	-0.063	0.446
Behavioural disengagement	-0.428	**0.000**†	-0.302	**0.000**†

† Statistically significant

4.7 Summary of Chapter

This chapter showed the results of the analysed data from the study. Overall mean Quality of life measured on the EQ-5D-5L percentage scale was slightly higher than the self-reported EQ-VAS percentage scale. Significant predictors of EQ-5D-5L Quality of life after controlling for other factors were persistence of symptoms after 30 days and development of complications post-COVID-19 infection. Significant predictors of EQ-VAS Quality of life after controlling for other factors were sex, persistence of symptoms after 30 days, worsening of comorbidities, and development of complications post-COVID-19 infection.

The most used coping strategy by respondents during the pandemic was problem-focused coping. Significant predictors of the various styles of coping were observed across the different age groups for avoidant coping strategies and among non-healthcare workers for both avoidant and problem-focused coping strategies.

Generally, as overall quality of life improved, the need for using a coping strategy reduced. Internal consistency of the tools used in measuring Quality of life and Coping strategies was assessed using Cronbach's alpha.

5 DISCUSSION

5.0 Introduction

This chapter discusses the findings from the analysed data with respect to existing literature and is sub-divided into five sections.

5.1 Quality of Life

In this study, 33.33% reported having anxiety or depression whilst 32.67% reported symptoms of pain or discomfort. The mean EQ-5D index value and mean EQ-VAS for COVID-19 recovered patients was (81.5 ± 12.0) % and (75.6 ± 22.0) % respectively. This corresponded to values obtained in a study by (Garratt et al., 2021) on the quality of life after COVID-19 without hospitalisation which also reported a mean EQ-5D index value of (82.0 ± 17) %.

It also corresponded to results obtained in a study by (Garrigues et al., 2020) on post-discharge persistent symptoms and health-related quality of life after hospitalization for COVID-19 which reported an overall mean EQ-5D index value of (86.0 ± 20) % overall mean EQ-VAS score of (70.3 ± 21.5) %. This same study also reported similar mean EQ-5D index value of (82.0 ± 21) % and mean EQ-VAS score of (71.7 ± 22.2) % for patients who were admitted to the ICU.

A multi-ethnic Asian study by (Lim et al., 2020) on the impact of COVID-19 on health-related quality of life in patients with cardiovascular disease also reported similar findings with mean EQ-VAS and mean EQ-5D index values of (78.6 ± 12.6) % and (89.8 ± 20.0) % respectively.

This may possibly be explained by a rapid global response by local governments and international bodies such as WHO, UNICEF, and IMF to provide support, financial relief, and public health assistance to curb the devasting nature of the disease.

5.2 Predictors of Quality of Life

This study found four main predictors of quality of life. These were sex, persistent symptoms, worsening comorbidities, and development of complications post-COVID-19 infection. All other factors (sex, educational level, occupation, comorbidities, treatment modality, rehabilitative services, and access to rehabilitative centres) were not significant predictors.

As age increased for participants in this study, their quality of life decreased by 0.15% for each additional year. This showed a significant association between age and quality of life. However, when other factors were adjusted for, age seized to be a significant independent predictor of quality of life. This concurs with literature that age is associated with health-related quality of life. This can probably be explained by ageing having a direct relationship with the increasing incidence of comorbidities and problems in patients. A study by (Arab-Zozani et al., 2020) also reported older patients having lower health-related QoL scores compared with younger patients confirming that COVID-19 impacts older patients more. Other studies also reported similar findings in patients >60 years of age having severer disease thereby necessitating ICU admission (Sommer et al., 2020) confirming poorer quality of life as age increases.

Women in this study had mean Quality of Life (EQ-VAS) scores 6.50% lower than that of males. Studies by (Arab-Zozani et al., 2020; Jacobs et al., 2020) have revealed similar findings. While reported prevalence of the disease is same between men and women and sometimes higher in men (Gebhard et al., 2020; Jin et al., 2020; Richardson

et al., 2020), it seems the disease severely affected women compared to men. This finding may probably be due to differences in physical activity levels between both sexes with women having lower physical activity levels compared with men (Sharara et al., 2018). Literature also suggests women being more susceptible to experiencing more somatic symptoms due to physiological and socialization factors (Barsky et al., 2001). Women may also be more worried when it comes to disease with a decreased ability of coping. In contrast to this study, other studies have reported an equal prevalence of COVID-19 in both sexes with males experiencing a greater severity of disease (Gebhard et al., 2020; Jin et al., 2020) probably due to behaviour, intrinsic risk, and exposure (Richardson et al., 2020).

Majority of respondents (83.3%) had obtained tertiary education in this study. Educational level was noticed to be significantly associated with differences in HRQoL scores where those attaining tertiary education had higher mean (EQ-5D-5L) % scores. This relationship was however confounded when other factors were considered. This differed from some reports which showed higher levels of education being associated with lower mean health related QoL scores as a result of higher education being associated with higher levels of concern about the novel virus as well as greater levels of awareness about the COVID-19 pandemic and its impact on life (Arab-Zozani et al., 2020). Another study by (Nguyen et al., 2020) also observed high prevalence of depression among patients with university/college education as a result of the stress from the COVID pandemic which affected their health related quality of life.

This study had majority of respondents being formally employed. This was noticed to be significantly associated with higher mean Quality of Life (EQ-VAS) % scores of 7.96. This relationship was however confounded when other factors were considered.

It corresponded to findings from literature reporting higher scores for employed patients. This could be due to employed patients having the opportunity to obtain better healthcare from their regular source of income which they had not lost during the pandemic (Tran et al., 2020). In this study respondents who were informally employed had the least rise in mean scores. This may probably be due to the fear people had for contracting the virus hence the restricted movements across the country as well as the greater proportion of people working from home and only going out when essentially necessary. This therefore affected their businesses resulting in lack of ready income with consequent anxiety and depression, lowering their quality of life.

All participants who had persistent symptoms after 30 days had significantly lower quality of life compared to those who did not have persistent symptoms beyond 30 days with the lowest reduction seen in those who had ageusia, dyspnoea, extreme fatigue, and headache (using the mean EQ-5D-5L % scores) and sleep disorder, chest pains, dyspnoea, and cough (using the mean EQ-VAS % scores). All persistent symptoms were significantly associated with markedly reduced mean QoL % scores (ranging from -9.63 to -26.27) and this corresponded with findings from literature reporting the presence of symptoms such as fatigue, muscle weakness, anxiety, depression and sleep difficulties as long as 6 months after onset of symptoms thereby affecting health related quality of life (Huang et al., 2021). (Garrigues et al., 2020) reported on persistent symptoms (fatigue, dyspnoea, memory loss, concentration and sleep disorders) 110 days after hospital discharge affecting patients quality of life in their study on post-discharge persistent symptoms and health-related quality of life after hospitalization for COVID-19.

Garratt et al., 2021 also reported in their study on the quality of life after COVID-19 without hospitalization, prolonged fatigue being a symptom for non-hospitalised patients several months after their diagnosis affecting their HRQoL. A study by Jacobs et al., 2020 on the persistence of symptoms and quality of life 35 days after hospitalization for COVID-19 infection also reported fatigue and dyspnoea as the most persistent symptom at day 35, greatly impacting the quality of life of patients with difficulty walking, lifting, and walking up stairs.

Majority of respondents had hypertension (65.1%) or diabetes (30.2%) before contracting COVID. Having comorbidities prior to COVID-19 infection was found to be statistically significant with participants reporting lower mean quality of life (EQ-VAS) % scores. This was consistent with findings from literature. Studies conducted by Lim et al., 2020 in Asians with pre-existing cardiovascular disease during the COVID-19 pandemic reported significant decline in the health-related quality of life (HRQoL) and psychological components of patients. Arab-Zozani et al., 2020 also reported lower HRQoL scores in patients with diabetes. This may probably be due to the fact that COVID exacerbates symptoms especially diabetes symptoms resulting in severer disease (Zhou & Tan, 2020). Additionally, patients with comorbidities constitute the vulnerable groups with lower mean quality of life scores during the pandemic (Nguyen et al., 2020).

Diabetes and hypertension were observed to be the comorbidities which worsened most among respondents in the study. Respondents with worsening comorbidities were significantly associated with lower mean quality of life (EQ-VAS) % scores which concurs with findings in literature. Research by (Zhou & Tan, 2020) on diabetic patients with COVID-19 reported abnormal pre- and post-prandial blood glucose levels in these

patients leading to higher risk of secondary infection and mortality. Poor glycaemic control has been associated with poorer outcomes in diabetic patients (Rao et al., 2020). These findings are also consistent with research conducted in the US on COVID-19 patients in critical care reporting patients with comorbidities such as hypertension, diabetes and cardiovascular disease being admitted more into intensive care units (ICU) as a result of severer disease leading to lower quality of life scores (Sommer et al., 2020).

About a quarter (23%) of respondents suffered complications due to COVID-19 infection. Such complications included post-traumatic stress disorder, difficulty mobilizing, deep vein thrombosis, acute kidney injury, pulmonary embolism, newly diagnosed diabetes and hypertension, migraine, and stroke. They were significantly associated with lower mean quality of life scores. Some researchers have investigated the long-term sequelae of extrapulmonary manifestations during follow-up. They reported complications such as persistent renal dysfunction, newly diagnosed diabetes, venous thrombo-embolism, cardiovascular events, and cerebrovascular events (Huang et al., 2021) and also revealed the mental health of those participants as poor or fair. The development of complications post-COVID-19 infection affects the mental and psychological health and wellbeing of patients consequently affecting their health-related quality of life.

Several respondents (33.33%) suffered from mild to extreme symptoms of anxiety or depression, whiles 32.67% had mild to extreme pain or discomfort. Despite this, majority (88.0%) were not offered rehabilitative services (psychotherapy, chest, and limb physiotherapy) during or after recovery from COVID-19. Unadjusted linear regression of Quality of Life (EQ-VAS) % scores showed significantly higher scores

for those offered rehabilitation but when other factors were considered, this relationship was no longer significant. Hence rehabilitation was not an independent predictor of the improved QoL. This observation was because rehabilitative services were offered only to few hospitalized patients who had severe to critical manifestations of COVID hence their report of a lower QoL during the study. Majority of the participants who had mild to moderate disease were not offered rehabilitative services. Some patients who were not offered such services commented on their desire for it. Some also reported seeking personal physiotherapists and psychologist services at their homes to help them through the recovery process.

Nine out of ten respondents (94%) had no access to rehabilitative centres. A few reasons for this being that they were not told, such centres were not available where they lived, some complained it was too expensive, too far away, or didn't know where to assess such services. Out of those that had access to rehabilitative centres over three-quarters (77.8%) benefited from psychotherapy (psychologist review).

A study conducted by (Lemhöfer et al., 2021) assessing the rehabilitation needs of patients during and after COVID-19 reported the disease causing a wide range of problems affecting several organ systems and persisting for long periods of time, requiring long-term rehabilitation needs. Many other studies (Chen et al., 2020; Nguyen et al., 2020) have also researched into the health-related quality of life of COVID patients and reported on the need for multi-disciplinary rehabilitative therapies to treat the wide range of symptoms and functional deficits, especially in the acute phase of the disease (Reisshauer et al., 2020; Stierli et al., 2020).

According to literature, rehabilitation is an extremely important and essential component of the treatment and recovery process of COVID patients and needs to be

initiated during all phases of the disease process to enable patients return to normal functionality early (Gutenbrunner et al., 2020). Due to the increasingly high numbers affected by the disease globally, psychiatrists and physiotherapists need to be increasingly involved in the rehabilitation of patients, to restore and improve quality of life by improving physical function, pulmonary function, and psychological efficiency (Demeco et al., 2020).

5.3 Coping Strategies

The coping strategy utilized most by study participants was Problem-focused coping with a mean score of 2.71 ± 0.64 SD, followed by Emotional-focused coping with a mean score of 2.32 ± 0.43 SD. The least used strategy was Avoidant coping with a mean score of 1.57 ± 0.39 SD. Problem-focused coping is a positive coping strategy aimed at changing stressful events (Baker & Berenbaum, 2007). Emotional-focused coping has both positive and negative strategies, but generally more positive outcomes aimed at regulating emotions associated with stressors. Avoidant coping is generally a negative strategy with harmful effects to one's physical well-being due to lack of actions to reduce stressors resulting in self-blame and helplessness (Fluharty & Fancourt, 2021). If used in the short-term period however avoidant coping may be considered positive in helping reduce acute stress.

Findings from this study suggests that participants coped well during the COVID pandemic using mostly positive coping mechanisms. Being a novel disease and causing havoc on the global front, many media outlets both locally and internationally provided daily updates on the virus. This was consistent with this study's findings where use of informational support was the most used problem-focused strategy with a mean score of 3.07 ± 0.98 SD.

A study conducted in Vietnam by (Thai et al., 2021) among public health and preventive medicine students on perceived stress and coping strategies during the COVID pandemic reported on the predominant use of approach coping strategies (active coping, acceptance, emotional support, planning, informational support, positive reframing, and planning) and this concurred with the strategies used by participants in this study. This may probably be due to the massive wealth of information that was being released daily about the virus leading to improved knowledge, awareness, and the necessary skills for coping although it was done in different target populations.

Religion is a major aspect of the lives of many Ghanaians. A high number of respondents used religion as a coping strategy with a mean score of 2.87 ± 0.95 SD. According to literature, many studies conducted in participants in several countries including Columbia reported on religion having a potential impact on coping (Bentzen, 2020; Meza, 2020). The reason for this could be from fear and panic which was evident in the early stages of the disease when not much was known about the virus. Many churches made use of online platforms to organize religious services and activities forming a psychosocial support system aiding coping mechanisms (Iddi et al., 2021).

Self-distraction was the most used form of avoidant coping mechanism with a mean score of 2.57 ± 1.03 SD. The acute use of strategies such as watching T.V, reading, listening to music, and sleeping as ways of distracting oneself during a crisis has been reported as helpful (Fullana et al., 2020). A possible explanation could probably be due to the fact that the mind is taken off the stressor acutely, thereby reducing the stress. Substance use was the least used coping mechanism with a mean score of 1.05 ± 0.20 SD. Participants reported resorting to the use of alcoholic beverages as a means of

reducing the stressor and this was confirmed in studies done in Ghana by (Asiamah et al., 2021) who reported a rise in risky health behaviours during the pandemic. Contrary to these findings were studies conducted in Spain reporting reductions in such behaviours as a result of a stricter and relatively longer lockdown period (López-Bueno et al., 2020).

5.4 Predictors of Coping Strategies

Middle aged adults (40 – 49 years) were found to use more of avoidant coping strategies, and this was found to be statistically significant. They were also found to use more emotional-focused strategies whilst older adults aged 50 – 59 years used more of problem-focused coping mechanisms. This was similar to findings from (Fluharty & Fancourt, 2021) who reported older adults (30 – 59 years) and the elderly (60+ years) using more of problem-focused and emotional-focused coping. In our study, the coping strategy for those aged 40 – 49 years was more focused on avoidant and emotional coping mechanisms whiles those aged 50 – 59 years was more focused on problem coping mechanisms. It however differed from findings in that same study where avoidant coping was found to rather be used more by younger adults aged 18 – 29 years. From literature, older adults are more likely to use approach coping strategies and less likely to adopt avoidant coping strategies as a result of years of experience dealing with stressors (Chen et al., 2018; Hamarat et al., 2002).

Females were noticed to have used more of all three coping mechanisms than men in this study. Although this was not found to be statistically significant, it concurred with findings from (Fluharty & Fancourt, 2021) who also reported women significantly using more of problem-focused, emotional-focused, and avoidant coping strategies than men. Several studies have also confirmed sex being a demographic predictor of coping

strategies with women scoring higher than men across all ranges of styles of coping (Frydenberg & Lewis, 1993; Panayiotou et al., 2014). A study conducted in Spain concluded on men being psychologically more affected during the lockdown (Ozamiz-Etxebarria et al., 2020). Men being mostly bread winners, and the lack of income as the result of the lockdown may increase the depression and anxiety, resulting in their ability to cope. These could be possible reasons why they coped less.

This study recorded participants with the least level of education using more of avoidant coping which corresponded to other researches which also found avoidance coping being used more in people with lower educational levels (Fluharty & Fancourt, 2021). Also similar to other studies was emotional-focused coping which was more common among those with a higher degree of education. In other studies, participants with a higher level of education used more of problem-focused mechanisms. In this study however, it was the participants with lower educational levels who mostly used problem-focused coping mechanisms. A possible reason for people with higher educational levels using more active coping mechanisms may be because they may be exposed to better problem-focused strategies during their years of studies.

Problem-focused and emotional-focused coping mechanisms was common among people who were informally employed whilst avoidant coping was common among those unemployed. This was consistent with reports from other studies which also found active coping mechanisms being more commonly used among those who were employed (Fluharty & Fancourt, 2021). In contrast to these findings, other studies have reported individuals on self-employment (informally employed) as less likely to cope well during the pandemic (Iddi et al., 2021). This is probably because they do not earn

monthly salary therefore the lockdown affected their businesses and income. (Adom et al., 2020; Bennett et al., 2020).

This current study showed that participants who were separated/divorced used all three coping strategies more although this finding was not statistically significant. This was consistent with literature reporting positive coping strategies being more commonly used among those separated/divorced (Iddi et al., 2021). An explanation for this may be because due to the divorce, there is likely to be more social support from family members to cope with the COVID. The divorce could also have been a stressor they had dealt with prior to the COVID resulting in a better likelihood of coping better during the pandemic.

Participants living in non-urban places were recorded to use more of avoidant and problem-focused coping strategies whilst those living in urban areas used more of emotional-focused coping mechanisms. Studies by (Fluharty & Fancourt, 2021) similarly reported their respondents living in urban areas of using more of supportive coping strategies. This may be because urban areas are more densely populated (Id et al., 2020). The pandemic hit harder the urban populations than the non-urban populations. Urban lifestyle is more stressful hence people may have already developed certain coping strategies for survival. They may therefore be better suited to cope with the COVID than those living in the non-urban areas.

Not being a healthcare worker was reported to cope better using all three coping strategies than being a healthcare worker. This was found to be statistically significant. A possible reason for healthcare workers coping less effectively could be because of the large scale of morbidity and mortality they had to observe physically and deal with

daily at the workplace which could have been a huge stressor during the pandemic. Literature suggests that healthcare workers are faced with higher levels of both psychological and physical stress resulting from their working environment (Id et al., 2020). Hence the pandemic imposed extra stress on health workers which affected their ability to cope well.

People who developed complications due to COVID-19 was observed to be associated with greater use of all three coping strategies than those who did not get any complications with significant associations observed for both avoidant and problem-focused coping styles. These findings were consistent with studies conducted by (Fluharty & Fancourt, 2021) who also reported people suffering from adversities as a result of COVID-19 using more of avoidant coping. It however differed from that same study which reported participants with complications using less of emotional-focused and problem-focused coping mechanisms than those who didn't have complications.

Having comorbidities prior to getting COVID and having comorbidities worsening during the infection seemed to be associated with more use of avoidant coping and problem-focused strategies but less use of emotional-focused coping. These were however not statistically significant in this study. Other studies have also reported similar findings where having comorbidities prior to COVID was shown to decrease one's chances of coping well (Iddi et al., 2021).

Participants with persistent symptoms lasting more than 30 days commonly used all three coping strategies more than those who didn't have persistent symptoms, and this was found to be significant for only the emotional-focused strategy.

5.5 Association Between Quality of Life and Coping Strategies

When people are faced with stressful situations, they use a coping strategy to help them overcome the stress. Many studies have reported adaptive or approach coping mechanisms being associated with better quality of life (Chabowski et al., 2018; Ulusoy & Kal, 2020). A reduction in the stressor from effective coping results in the improvement in quality of life with a subsequent resultant decrease in the coping mechanisms being used for the stressor.

In general, the need for the use of coping skills occurs more when QoL is low. In this study, an increase in the EQ-5D-5L Quality of life of participants was generally associated with a decrease in the overall need to use a coping strategy and this was statistically significant for emotional-focused coping strategies. A possible reason for this finding could be because as the stressors in the lives of participants reduced, their quality-of-life improved leading to a gradual decrease in their need to use a coping mechanism as the magnitude of stressors reduced. With more information being discovered on the novel virus, better and more effective treatment modalities are being instituted, resulting in a decrease in the fear and stigma surrounding the disease. The increased knowledge and understanding of the stressor (COVID-19) has resulted in a reduction in morbidity and mortality globally, with more people learning to cope better. People may only find the necessity to cope when there are ongoing stressors.

This study also detected a positive association between improvement in quality of life of respondents and their use of humour for coping. They generally laughed more and made more jokes as their condition improved. They also used more active coping techniques as their quality of life improved allowing them to cope better during the pandemic. This was corroborated by other studies which also found a positive

association between quality of life and positive coping strategies (Holubova & Prasko, 2017).

Participants in this study also acutely used more self-distraction methods like watching more TV and reading as their quality of life improved. An explanation for this may be due to these habits being nurtured during the lockdown period hence becoming a part and parcel of their new lifestyle. They however developed some negative coping mechanisms of using substances like alcohol more during the period as life got better probably to enable them to forget about the difficulties they faced, the trauma they experienced or to celebrate surviving the disease.

6 CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter presents the conclusions, recommendations, and limitations of the study.

6.1 Conclusion

This study was done to estimate the quality of life of COVID-19 recovered patients as well as determine the predictors of quality of life. It also sought to identify the coping strategies utilized during the pandemic, to determine the predictors of coping, and finally determine the association between quality of life and coping strategies employed by COVID-19 recovered patients.

Overall, this study shows that majority of respondents maintained a relatively good quality of life after surviving COVID-19. Persistence of symptoms, development of complications and worsening of comorbidities were found to significantly affect quality of life negatively. Several respondents suffered from anxiety or depression as well as pain or discomfort which negatively affected their quality of life. Although rehabilitation was associated with higher quality of life scores, majority of respondents were not offered rehabilitation services during and after recovery. Those who received rehabilitation services at the centre and were advised to continue elsewhere upon discharge, did not have access to rehabilitation centres due to various reasons such as distance, expense, and lack of accessibility.

During the pandemic, COVID patients generally coped very well using mostly positive coping strategies. Socio-demographic factors such as age and being a non-healthcare worker significantly predicted some of the coping strategies that were used. Other

significant predictors included persistent symptoms after 30 days and developing complications associated with the COVID.

An increasing EQ-5D-5L Quality of life was associated with a decreasing need to use majority of the coping strategies. It was however positively associated with active coping, humour, and substance use.

These findings have shown that persistence of symptoms, comorbidities, and complications negatively affect one's quality of life. Rehabilitation (especially psychotherapy / clinical psychology) has been shown to considerably improve these factors. Improvement of these factors together with the adaptation of positive coping mechanisms results in an overall improvement in quality of life.

There aren't any well-established facilities or services in Ghana that offer care to patients post-COVID-19 infection. This may have possibly affected their recovery and QoL. Further research is needed to assess feasibility of establishing such services. This should help in guiding public health policies and rehabilitation interventions for the ongoing pandemic and other public health crisis.

6.2 Limitations

1. Responses to questions on quality of life and coping strategies in this study were based on the patient's recall and these may be subject to possible recall bias.
2. This study was a cross-sectional study which cannot establish true causality. It does not assess the "before" scenario. It is therefore not possible to know whether decreases in quality of life existed before the patients contracted COVID.

3. This study was conducted in only one treatment centre. It may therefore not reflect the experiences of patients in other treatment centres especially regarding access to rehabilitation services and clinical psychologists.
4. COVID-19 is a novel disease and the knowledge on its pathology, management and complications is now evolving. It is possible that findings of this study may change (such as the level of quality of life and coping style choices) as there is better understanding of the disease.

6.3 Recommendations

1. The need to include rehabilitation and referral to clinical psychologists as part of the standard treatment protocol for patients. From the study, rehabilitation was found to be associated with an increase in quality of life. It was however noted that majority of respondents in this study suffered from mild to extreme symptoms of depression and pain but were not offered rehabilitation or psychological therapy during or after recovery from COVID-19.
2. To set up rehabilitation centres for all survivors of COVID with particular emphasis on psychotherapy as the few respondents of this study who were prescribed rehabilitation complained of not having access to such facilities because none was available in their area of residence, or such facilities were very far away from where they live.
3. The need to set up more post-COVID-19 clinics for follow-up to characterize the sequelae of the disease (persistence of symptoms and complications) since these factors were shown to affect a person's quality of life. These clinics would help to increase accessibility to care and mitigate or treat these sequelae.

4. Patients can also be trained and motivated to employ positive coping mechanisms in situations such as COVID to overcome stressors during their infections.

RESEARCH

- Further research is needed to assess the feasibility of establishing facilities or services that offer post-COVID care in Ghana.

- Further research is needed to evaluate the long-term effect of COVID and coping mechanisms on the quality of life of these patients.

7 REFERENCES

Adhikari, S. P., Meng, S., Wu, Y. J., Mao, Y. P., Ye, R. X., Wang, Q. Z., Sun, C., Sylvia, S., Rozelle, S., Raat, H., & Zhou, H. (2020). Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: A scoping review. *Infectious Diseases of Poverty*, *9*(1). https://doi.org/10.1186/s40249-020-00646-x

Adom, D., Adu-Mensah, J., & PA., S. (2020). Hand-to-mouth work culture and the COVID-19 lockdown restric- tions: experiences of selected informal sector workers in Kumasi, Ghana. *Research Journal in Advanced Humanities.*, *1*(2), 45–63.

Afrane, Y. A. (2021). The COVID-19 situation in Ghana. *The Royal Society of Tropical Medicine & Hygiene*.

Ajay, S., & Micah, M. (2014). Sampling Techniques & Dertermining Sample Size in Applied Statistics Research: an Overview. *International Journal of Economics, Commerce and Management*, *II*(11), 1–22. http://ijecm.co.uk/%0Ahttp://ijecm.co.uk/%0Ahttp://ijecm.co.uk/wp-content/uploads/2014/11/21131.pdf

Algorani, E., & Gupta, V. (2021). Coping Mechanisms. *N: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing*.

Arab-Zozani, M., Hashemi, F., Safari, H., Yousefi, M., & Ameri, H. (2020). Health-related quality of life and its associated factors in COVID-19 patients. *Osong Public Health and Research Perspectives*, *11*(5), 296–302. https://doi.org/10.24171/j.phrp.2020.11.5.05

Arentz, M., Yim, E., Klaff, L., Lokhandwala, S., Riedo, F. X., Chong, M., & Lee, M. (2020). Characteristics and Outcomes of 21 Critically Ill Patients with COVID-19 in Washington State. *JAMA - Journal of the American Medical Association*, *323*(16), 1612–1614. https://doi.org/10.1001/jama.2020.4326

Arora, A., Jha, A., Alat, P., & Das, S. (2020). Understanding coronaphobia. *Asian J Psychiatr*.

Asiamah, N., Opuni, F. F., Mends-Brew, E., Mensah, S. W., Mensah, H. K., & Quansah, F. (2021). Short-Term Changes in Behaviors Resulting from COVID-19-Related Social Isolation and Their Influences on Mental Health in Ghana. *Community Mental Health Journal*, *57*(1), 79–92. https://doi.org/10.1007/s10597-020-00722-4

Asmundson, G. J. G., & Taylor, S. (2020). Coronaphobia: Fear and the 2019-nCoV outbreak. *Journal of Anxiety Disorders*, *70*(February). https://doi.org/10.1016/j.janxdis.2020.102196

Bai, W. Z., Li, Y. ., & Hashikawa, T. (2020). The neuroinvasive potential of SARS-CoV2 may play a role in the respiratory failure of COVID-19 patients. *Journal of Medical Virology*, *92*(6), 552–555. https://doi.org/10.1002/jmv.25728

Baker, J. P., & Berenbaum, H. (2007). Emotional approach and problem-focused coping: A comparison of potentially adaptive strategies. *Cognition and Emotion*, *21*(1), 95–118.

Barsky, A. J., Peekna, H. M., & Borus, J. F. (2001). Somatic symptom reporting in women and men. *Journal of General Internal Medicine*, *16*(4), 266–275. https://doi.org/10.1046/j.1525-1497.2001.016004266.x

Beeching, N., & Fowler, R. (2020). Coronavirus disease 2019 (COVID-19). *BMJ Best Practices*.

Behzad, S., Aghaghazvini, L., Radmard, A. R., & Gholamrezanezhad, A. (2020). Extrapulmonary manifestations of COVID-19: Radiologic and clinical overview. *Clinical Imaging*, *66*(Cdc), 35–41. https://doi.org/10.1016/j.clinimag.2020.05.013

Bekairy, A. M., Bustami, R. T., Almotairi, M., Jarab, A., Katheri, A. M., Aldebasi, T. M., & Aburuz, S. (2018). Validity and reliability of the Arabic version of the the EuroQOL (EQ- 5D). A study from Saudi Arabia. *International Journal of Health Sciences*, *12*(2), 16–20.

Bennett, N., Finkbeiner, E., Ban, N., Belhabib, D., Jupiter, S., & Kittinger, J. et al. (2020). The COVID-19 Pandemic, Small-Scale Fisheries and Coastal Fishing Communities. *Coastal Management*, *48*(4), 336–347.

Bentzen, J. (2020). *In crisis, we pray: Religiosity and the COVID-19 pandemic*.

Bhatraju, P. K., Ghassemieh, B. J., Nichols, M., Kim, R., Jerome, K. R., Nalla, A. K., Greninger, A. L., Pipavath, S., Wurfel, M. M., Evans, L., Kritek, P. A., West, T. E., Luks, A., Gerbino, A., Dale, C. R., Goldman, J. D., O'Mahony, S., & Mikacenic, C. (2020). Covid-19 in Critically Ill Patients in the Seattle Region — Case Series. *New England Journal of Medicine*, *382*(21), 2012–2022. https://doi.org/10.1056/nejmoa2004500

Bonful, H. A., Addo-Lartey, A., Aheto, J. M. K., Ganle, J. K., Sarfo, B., & Aryeetey, R. (2020). Prevention of COVID-19 in Ghana: Compliance audit of selected transportation stations in the Greater Accra region of Ghana. *MedRxiv*, *501*(c), 2354500. https://doi.org/10.1101/2020.06.03.20120196

Bonomi, A. E., Patrick, D. L., Bushnell, D. M., & Martin, M. (2000). Quality of life measurement - Will we ever be satisfied? *Journal of Clinical Epidemiology*, *53*(1), 19–23. https://doi.org/10.1016/S0895-4356(99)00121-3

Busch, I. M., Moretti, F., Purgato, M., Barbui, C., Wu, A. W., & Rimondini, M. (2020). Dealing with Adverse Events: A Meta-analysis on Second Victims' Coping Strategies. *Journal of Patient Safety*, *16*(2), E51–E60. https://doi.org/10.1097/PTS.0000000000000661

Cao, B., Wang, Y., Wen, D., Liu, W., Wang, J., Fan, G., Ruan, L., Song, B., Cai, Y., Wei, M., Li, X., Xia, J., Chen, N., Xiang, J., Yu, T., Bai, T., Xie, X., Zhang, L., Li, C., … Wang, C. (2020). A Trial of Lopinavir–Ritonavir in Adults Hospitalized with Severe Covid-19. *New England Journal of Medicine*, *382*(19), 1787–1799. https://doi.org/10.1056/nejmoa2001282

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: a theoretically based approach. *Journal of Personality and Social Psychology*, *56*(2), 267–283. https://doi.org/10.1037//0022-3514.56.2.267

Cascella, M., Rajnik, M., Cuomo, A., Dulebohn, S. C., & Di Napoli, R. (2020). Features, Evaluation, and Treatment of Coronavirus. *StatPearls*, *Cdc*, 19. https://doi.org/10.26355/eurrev

CDC. (2019). *Scientific Brief: SARS-CoV-2 and Potential Airborne Transmission*.

CDC. (2020). COVID-19 How COVID-19 Spreads COVID-19 spreads very easily from person to person COVID-19 most commonly spreads during close contact COVID-19 can sometimes be spread by airborne transmission contaminated surfaces. *How COVID-19 Spreads*, 2020–2022. https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html#print

CDC. (2021). *Symptoms of COVID-19*. 2021. https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fabout%2Fsymptoms.html

CDC COVID-19 Response Team. (2020a). Preliminary Estimates of the Prevalence of Selected Underlying Health Conditions Among Patients with Coronavirus Disease 2019 - United States, February 12-March 28, 2020. *Morbidity and Mortality Weekly Report*, *69*(13), 382–386. https://doi.org/https://doi.org/10.15585/mmwr.mm6913e2

CDC COVID-19 Response Team. (2020b). Severe Outcomes Among Patients with Coronavirus Disease 2019 (COVID-19) — United States, February 12–March 16, 2020. *MMWR. Morbidity and Mortality Weekly Report*, *69*(12), 343–346. https://doi.org/10.15585/mmwr.mm6912e2

Centers for Disease Control and Prevention. (2020). *Coronavirus Disease 2019 (COVID-19), Cases, Data, & Surveillance*.

Chabowski, M., Jankowska-Polańska, B., Lomper, K., & Janczak, D. (2018). The effect of coping strategy on quality of life in patients with NSCLC. *Cancer Management and Research*, *10*, 4085–4093. https://doi.org/10.2147/CMAR.S175210

Chan, J. F. W., Yuan, S., Kok, K. H., To, K. K. W., Chu, H., Yang, J., Xing, F., Liu, J., Yip, C. C. Y., Poon, R. W. S., Tsoi, H. W., Lo, S. K. F., Chan, K. H., Poon, V. K. M., Chan, W. M., Ip, J. D., Cai, J. P., Cheng, V. C. C., Chen, H., … Yuen, K. Y. (2020). A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *The Lancet*, *395*(10223), 514–523. https://doi.org/10.1016/S0140-6736(20)30154-9

Chaturvedi, S. K., & Muliyala, K. P. (2016). The Meaning in Quality of Life. *Journal of Psychosocial Rehabilitation and Mental Health*, *3*(2), 47–49. https://doi.org/10.1007/s40737-016-0069-2

Chen, Li, T., Gong, F. H., Zhang, J. S., & Li, X. K. (2020). Predictors of Health-Related Quality of Life and Influencing Factors for COVID-19 Patients, a Follow-Up at One Month. *Frontiers in Psychiatry*, *11*(July), 1–6. https://doi.org/10.3389/fpsyt.2020.00668

Chen, Y., Peng, Y., Xu, H., & O'Brien, W. (2018). Age differences in stress and coping: problem-focused strategies mediate the relationship between age and positive affect. *The International Journal of Aging and Human Development*, *86*(4), 347–363. https://doi.org/10.1177/0091415017720890

Chesser, H., Chambliss, J. M., & Zwemer, E. (2017). Acute Hemorrhagic Edema of Infancy after Coronavirus Infection with Recurrent Rash. *Case Reports in Pediatrics*, *2017*(C), 1–3. https://doi.org/10.1155/2017/5637503

Chriscaden Kimberly. (2020). Impact of COVID-19 on people's livelihoods, their health and our food systems. *World Health Organization*, 1. https://www.who.int/news/item/13-10-2020-impact-of-covid-19-on-people's-livelihoods-their-health-and-our-food-systems

Crosby, R., & Noar, S. (2011). *PRECEDE-PROCEED*. Rural Health Information Hub. https://www.ruralhealthinfo.org/toolkits/health-promotion/2/program-models/precede-proceed

Demeco, A., Marotta, N., Barletta, M., Pino, I., Marinaro, C., Petraroli, A., Moggio, L., & Ammendolia, A. (2020). Rehabilitation of patients post-COVID-19 infection: a literature review. *Journal of International Medical Research*, *48*(8). https://doi.org/10.1177/0300060520948382

Dias, C., Cruz, J. F., & Fonseca, A. M. (2012). The relationship between multidimensional competitive anxiety, cognitive threat appraisal, and coping strategies: A multi-sport study. *International Journal of Sport and Exercise Psychology*, *10*(1), 52–65.

Docherty, A. B., Harrison, E. M., Green, C. A., Hardwick, H. E., Pius, R., Norman, L., Holden, K. A., Read, J. M., Dondelinger, F., Carson, G., Merson, L., Lee, J., Plotkin, D., Sigfrid, L., Halpin, S., Jackson, C., Gamble, C., Horby, P. W., Nguyen-Van-Tam, J. S., … Semple, M. G. (2020). Features of 20 133 UK patients in hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: Prospective observational cohort study. *The BMJ*, *369*, 1–2. https://doi.org/10.1136/bmj.m1985

Eastin, C., & Eastin, T. (2020). Clinical Characteristics of Coronavirus Disease 2019 in China. *The Journal of Emergency Medicine*, *58*(4), 711–712. https://doi.org/10.1016/j.jemermed.2020.04.004

Euroqol Group. (1990). EuroQol - a new facility for the measurement of health-related quality of life. *Health Policy*, *16*(3), 199–208. https://doi.org/10.1016/0168-8510(90)90421-9

EuroQol Group. (2021). *EQ-5D*. EQ-5D-5L Questionnaire. https://euroqol.org/eq-5d-instruments/

Flesia, L., Fietta, V., Colicino, E., Segatto, B., & Monaro, M. (2020). *Stable psychological traits predict perceived stress related to the COVID-19 outbreak.* https://doi.org/10.31234/osf.io/yb2h8.

Fluharty, M., & Fancourt, D. (2021). How have people been coping during the COVID-19 pandemic? Patterns and predictors of coping strategies amongst 26,016 UK adults. *BMC Psychology*, *9*(1), 1–12. https://doi.org/10.1186/s40359-021-00603-9

Franceschi, A. M., Ahmed, O., Giliberto, L., & Castillo, M. (2020). Hemorrhagic posterior reversible encephalopathy syndrome as a manifestation of COVID-19 infection. *American Journal of Neuroradiology*, *41*(7), 1173–1176. https://doi.org/10.3174/AJNR.A6595

Frydenberg, E., & Lewis, R. (1993). Boys play sport and girls turn to others: age, gender and ethnicity as determinants of coping. *Journal of Adolescence*, *16*(3), 253–266. https://doi.org/10.1006/jado.1993.1024

Frye, B. C., Meiss, F., von Bubnoff, D., Zissel, G., & Müller-Quernheim, J. (2020). Vasoactive Intestinal Peptide in Checkpoint Inhibitor–Induced Pneumonitis. *New England Journal of Medicine*, *382*(26), 2573–2574. https://doi.org/10.1056/nejmc2000343

Fullana, M. A., Hidalgo-Mazzei, D., Vieta, E., & Radua, J. (2020). Coping behaviors associated with decreased anxiety and depressive symptoms during the COVID-19 pandemic and lockdown. *Journal of Affective Disorders*, *275*(July), 80–81. https://doi.org/10.1016/j.jad.2020.06.027

Gao, Q. Y., Chen, Y. X., & Fang, J. Y. (2020). 2019 Novel coronavirus infection and gastrointestinal tract. *Journal of Digestive Diseases*, *21*(3), 125–126. https://doi.org/10.1111/1751-2980.12851

Garcia, F. ., Barraza-Pena, C. ., Wlodarczyk, A., Alvear-Carrasco, M., & Reyes-Reyes, A. (2018). Psychometric properties of the Brief-COPE for the evaluation of coping strategies in the Chilean population. *Psicol Reflex Crit.*, *31*(1), 22. https://doi.org/10.1186/ s41155-018-0102-3

Garratt, A. M., Ghanima, W., Einvik, G., & Stavem, K. (2021). Quality of life after COVID-19 without hospitalisation: Good overall, but reduced in some dimensions. *Journal of Infection*, *82*(5), 186–230. https://doi.org/10.1016/j.jinf.2021.01.002

Garrigues, E., Janvier, P., Kherabi, Y., Le Bot, A., Hamon, A., Gouze, H., Doucet, L., Berkani, S., Oliosi, E., Mallart, E., Corre, F., Zarrouk, V., Moyer, J. D., Galy, A., Honsel, V., Fantin, B., & Nguyen, Y. (2020). Post-discharge persistent symptoms and health-related quality of life after hospitalization for COVID-19. *Journal of Infection*, *81*(6), e4–e6. https://doi.org/10.1016/j.jinf.2020.08.029

Gates, B. (2020). Responding to Covid-19-A Once-in-a-Century Pandemic? *New England Journal of Medicine*, *382*(18), 1677–1679. https://doi.org/10.1056/NEJMp2003762

Gebhard, C., Regitz-Zagrosek, V., Neuhauser, H. K., Morgan, R., & Klein, S. L. (2020). Impact of sex and gender on COVID-19 outcomes in Europe. *Biology of Sex Differences*, *11*(1), 1–13. https://doi.org/10.1186/s13293-020-00304-9

Ghana Health Service. (2020). *COVID-19 Updates | Ghana*.

Ghana Health Service. (2021). *COVID-19 Updates | Ghana*. https://www.ghs.gov.gh/covid19/

Gianotti, R., Veraldi, S., Recalcati, S., Cusini, M., Ghislanzoni, M., Boggio, F., & Fox, L. P. (2020). Cutaneous clinico-pathological findings in three covid-19-positive patients observed in the metropolitan area of Milan, Italy. *Acta Dermato-Venereologica*, *100*(8), 1–3. https://doi.org/10.2340/00015555-3490

Goodman, B. B. (2021). *First Confirmed U . S . Cases of COVID Reinfections*. 2021.

Green, L., & Kreuter, M. W. (2005). Health program planning: An educational and ecological approach (4th ed.). *New York: McGraw Hill.*

Guan, W., Ni, Z., Hu, Y., Liang, W., Ou, C., He, J., Liu, L., Shan, H., Lei, C., Hui, D. S. C., Du, B., Li, L., Zeng, G., Yuen, K.-Y., Chen, R., Tang, C., Wang, T., Chen, P., Xiang, J., … Zhong, N. (2020). Clinical Characteristics of Coronavirus Disease 2019 in China. *New England Journal of Medicine*, *382*(18), 1708–1720. https://doi.org/10.1056/nejmoa2002032

Gunnell, D., Appleby, L., Arensman, E., Hawton, K., John, A., Kapur, N., Khan, M., O'Connor, R. C., Pirkis, J., Caine, E. D., Chan, L. F., Chang, S. Sen, Chen, Y. Y., Christensen, H., Dandona, R., Eddleston, M., Erlangsen, A., Harkavy-Friedman, J., Kirtley, O. J., … Yip, P. S. (2020). Suicide risk and prevention during the COVID-19 pandemic. *The Lancet Psychiatry*, *7*(6), 468–471. https://doi.org/10.1016/S2215-0366(20)30171-1

Guo, Y.-R., Cao, Q.-D., Hong, Z.-S., Tan, Y.-Y., Chen, S.-D., Jin, H.-J., Tan, K.-S., Wang, D.-Y., & Yan, Y. (2020). The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak-an update on the status. *Military Medical Research*, *7*(1), 11. https://doi.org/10.1186/s40779-020-00240-0

Gutenbrunner, C., Stokes, E. K., Dreinhöfer, K., Monsbakken, J., Clarke, S., Côté, P., Urseau, I., Constantine, D., Tardif, C., Balakrishna, V., & Nugraha, B. (2020). Why rehabilitation must have priority during and after the COVID-19-pandemic: A position statement of the global rehabilitation alliance. *Journal of Rehabilitation Medicine*, *52*(7). https://doi.org/10.2340/16501977-2713

Hamarat, E., Thompson, D., Aysan, F., Steele, D., Matheny, K., & Simons, C. (2002). Age differences in coping resources and satisfaction with life among middle-aged, young-old, and oldest-old adults. *The Journal of Genetic Psychology*, *163*(3), 360–367. https://doi.org/10.1080/00221320209598689.

Helms, J., Kremer, S., Merdji, H., Clere-Jehl, R., Schenck, M., Kummerlen, C., Collange, O., Boulay, C., Fafi-Kremer, S., Ohana, M., Anheim, M., & Meziani, F. (2020). Neurologic Features in Severe SARS-CoV-2 Infection. *New England Journal of Medicine*, *382*(23), 2268–2270. https://doi.org/10.1056/nejmc2008597

Heymann, D. L., & Shindo, N. (2020). COVID-19: what is next for public health? *The Lancet*, *395*(10224), 542–545. https://doi.org/10.1016/S0140-6736(20)30374-3

Hoehl, S., Rabenau, H., Berger, A., Kortenbusch, M., Cinatl, J., Bojkova, D., Behrens, P., Böddinghaus, B., Götsch, U., Naujoks, F., Neumann, P., Schork, J., Tiarks-Jungk, P., Walczok, A., Eickmann, M., Vehreschild, M. J. G. T., Kann, G., Wolf, T., Gottschalk, R., & Ciesek, S. (2020). Evidence of SARS-CoV-2 Infection in Returning Travelers from Wuhan, China. *New England Journal of Medicine*, *382*(13), 1278–1280. https://doi.org/10.1056/nejmc2001899

Holubova, M., & Prasko, J. (2017). Connection between coping strategies and quality of life in outpatient with depression – cross-sectional study. *European Psychiatry*. https://doi.org/10.1016/j.eurpsy.2017.02.004.

Huang, C., Huang, L., Wang, Y., Li, X., Ren, L., Gu, X., Kang, L., Guo, L., Liu, M., Zhou, X., Luo, J., Huang, Z., Tu, S., Zhao, Y., Chen, L., Xu, D., Li, Y., Li, C., Peng, L., … Cao, B. (2021). 6-month consequences of COVID-19 in patients discharged from hospital: a cohort study. *The Lancet*, *397*(10270), 220–232. https://doi.org/10.1016/S0140-6736(20)32656-8

Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., Zhang, L., Fan, G., Xu, J., Gu, X., Cheng, Z., Yu, T., Xia, J., Wei, Y., Wu, W., Xie, X., Yin, W., Li, H., Liu, M., … Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*, *395*(10223), 497–506. https://doi.org/10.1016/S0140-6736(20)30183-5

Hunger, M., Sabariego, C., Stollenwerk, B., Cieza, A., & Leidl, R. (2012). Validity, reliability and responsiveness of the EQ-5D in German stroke patients undergoing rehabilitation. *Quality of Life Research*, *21*(7), 1205–1216. https://doi.org/10.1007/s11136-011-0024-3

ICM Anaesthesia COVID-19. (2020). *Background to Coronavirus (COVID-19)*. https://icmanaesthesiacovid-19.org/background

Id, L. H., Lei, W., Xu, F., Liu, H., & Yu, L. (2020). *Emotional responses and coping strategies in nurses and nursing students during Covid-19 outbreak : A comparative study*. 1–12. https://doi.org/10.1371/journal.pone.0237303

Iddi, S., Obiri-Yeboah, D., Aboh, I. K., Quansah, R., Owusu, S. A., Enyan, N. I. E., Kodom, R. V., Nsabimana, E., Jansen, S., Ekumah, B., Boamah, S. A., Boateng, G. O., Doku, D. T., & Armah, F. A. (2021). Coping strategies adapted by Ghanaians during the COVID-19 crisis and lockdown: A population-based study. *PLoS ONE*, *16*(6 June), 1–21. https://doi.org/10.1371/journal.pone.0253800

Ijezie, O. A., Okagbue, H. I., Oloyede, O. A., Heaslip, V., Davies, P., & Healy, J. (2021). Coronavirus disease 2019 (COVID-19) and individuals with intellectual and developmental disabilities in Nigeria. *Journal of Public Affairs*, *Cdc*, 19. https://doi.org/10.1002/pa.2601

Jacobs, L. G., Paleoudis, E. G., Bari, D. L. Di, Nyirenda, T., Friedman, T., Gupta, A., Rasouli, L., Zetkulic, M., Balani, B., Ogedegbe, C., Bawa, H., Berrol, L., Qureshi,

N., & Aschner, J. L. (2020). Persistence of symptoms and quality of life at 35 days after hospitalization for COVID-19 infection. *PLoS ONE*, *15*(12 December), 1–14. https://doi.org/10.1371/journal.pone.0243882

Jan, U., Cennimo, A. D. J., Editor, C., & Stuart, M. (2021). *Coronavirus Disease 2019 (COVID-19) Clinical Presentation What to Read Next on Medscape*. 2021.

Jin, J. M., Bai, P., He, W., Wu, F., Liu, X. F., Han, D. M., Liu, S., & Yang, J. K. (2020). Gender Differences in Patients With COVID-19: Focus on Severity and Mortality. *Frontiers in Public Health*, *8*. https://doi.org/10.3389/fpubh.2020.00152

Johns Hopkins University. (2020). *Coronavirus Resource Center*. https://coronavirus.jhu.edu/

Joob, B., & Wiwanitkit, V. (2020). COVID-19 can present with a rash and be mistaken for dengue. *Journal of the American Academy of Dermatology*, *82*(5), e177. https://doi.org/10.1016/j.jaad.2020.03.036

Karmakar, M., Lantz, P. M., & Tipirneni, R. (2021). Association of Social and Demographic Factors with COVID-19 Incidence and Death Rates in the US. *JAMA Network Open*, *4*(1), 1–12. https://doi.org/10.1001/jamanetworkopen.2020.36462

Keeley, P., Buchanan, D., Carolan, C., Pivodic, L., Tavabie, S., & Noble, S. (2020). Symptom burden and clinical profile of COVID-19 deaths: A rapid systematic review and evidence summary. *BMJ Supportive and Palliative Care*, *10*(4), 381–384. https://doi.org/10.1136/bmjspcare-2020-002368

Kelvin, D., & Rubino, S. (2020). Fear of the novel coronavirus. *Journal of Infection in Developing Countries*, *14*(1), 1–2. https://doi.org/10.3855/jidc.12496.

Lei, W., Huang, L., Xu, F., Liu, H., & Yu, L. (2020). Emotional responses and coping strategies in nurses and nursing students during Covid-19 outbreak: A comparative study. *PLoS ONE*, *15*(8 August), 1–12. https://doi.org/10.1371/journal.pone.0237303

Lemhöfer, C., Gutenbrunner, C., Schiller, J., Loudovici-Krug, D., Best, N., Bökel, A., & Sturm, C. (2021). Assessment of rehabilitation needs in patients after COVID-19: Development of the COVID-19-rehabilitation needs survey. *Journal of Rehabilitation Medicine*, *53*(4), jrm00183. https://doi.org/10.2340/16501977-2818

Li, Q., Guan, X., Wu, P., Wang, X., Zhou, L., Tong, Y., Ren, R., Leung, K. S. M., Lau, E. H. Y., Wong, J. Y., Xing, X., Xiang, N., Wu, Y., Li, C., Chen, Q., Li, D., Liu, T., Zhao, J., Liu, M., … Feng, Z. (2020). Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia. *New England Journal of Medicine*, *382*(13), 1199–1207. https://doi.org/10.1056/nejmoa2001316

Lim, S. L., Woo, K. L., Lim, E., Ng, F., Chan, M. Y., & Gandhi, M. (2020). Impact of COVID - 19 on health - related quality of life in patients with cardiovascular disease : a multi - ethnic Asian study. *Health and Quality of Life Outcomes*, 1–7. https://doi.org/10.1186/s12955-020-01640-5

Limcaoco, R., Mateos, E., Fernandez, J. M., & Roncero, C. (2020). Anxiety , Worry and Perceived Stress in the World Due to the Covid-19 Pandemic. *Med Rxiv*, *Jan*, 1.

López-Bueno, R., Calatayud, J., Casaña, J., Casajús, J. A., Smith, L., Tully, M. A., Andersen, L. L., & López-Sánchez, G. F. (2020). COVID-19 Confinement and Health Risk Behaviors in Spain. *Frontiers in Psychology*, *11*(June), 1–10. https://doi.org/10.3389/fpsyg.2020.01426

Lucia, S., Martin, S., Pierre, S., & Helena, S. (2021). *Coronavirus Cases : Deaths : Recovered :* 1–2.

Luo, N., Chew, L. H., Ned, B., Fong, K. Y., Med, M. M. I., Koh, D. R., & Med, M. M. I. (2017). Validity and Reliability of the EQ-5D Self- report Questionnaire in Chinese-speaking Patients with Rheumatic Diseases. *Annals Academy of Medicine*, *32*, 685–690.

Mamun, M., Sakib, N., Gozal, D., Bhuiyan, A., Hossain, S., Bodrud-Doza, M., Al Mamun, F., Hosen, I., Safiq, M., Abdullah, A., Sarker, M., Rayhan, I., Sikder, M., Muhit, M., Lin, C., Griffiths, M., & Pakpour, A. (2021). he COVID-19 pandemic and serious psychological consequences in Bangladesh: A population-based nationwide study. *J Affect Disord*, *15*(279), 462–472. https://doi.org/0.1016/j.jad.2020.10.036.

Mao, R., Qiu, Y., He, J. S., Tan, J. Y., Li, X. H., Liang, J., Shen, J., Zhu, L. R., Chen, Y., Iacucci, M., Ng, S. C., Ghosh, S., & Chen, M. H. (2020). Manifestations and prognosis of gastrointestinal and liver involvement in patients with COVID-19: a systematic review and meta-analysis. *The Lancet Gastroenterology and Hepatology*, *5*(7), 667–678. https://doi.org/10.1016/S2468-1253(20)30126-6

Mennechet, F., & Dzomo, G. (2020). Coping with COVID-19 in sub-Saharan Africa: what might the future hold? *Virologica Sinica.* https://doi.org/10.1007/s12250-020-00279-2

Mertens, G., Gerritsen, L., Duijndam, S., Salemink, E., & Engelhard, I. (2020). Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *Journal of Anxiety Disorders.*

Meza, D. (2020). In a Pandemic Are We More Religious? Traditional Practices of Catholics and the COVID-19 in Southwestern Colombia. *International Journal of Latin American Religions*, 218–234.

Mohanraj, R., Jeyaseelan, V., & Kumar, S. et al. (2015). Cultural adaptation of the brief COPE for persons living with HIV/AIDS in southern India. *AIDS Behav.*, *19*(2), 341–351. https://doi.org/10.1007/s10461-014- 0872-2

Morawska, L., & Milton, D. (2020). It is time to address airborne transmission of COVID-19 [Published online July 6, 2020]. *Clin Infect Dis*.

Nguyen, H. C., Nguyen, M. H., Do, B. N., Tran, C. Q., Nguyen, T. T. P., Pham, K. M., Pham, L. V., Tran, K. V., Duong, T. T., Tran, T. V., Duong, T. H., Nguyen, T. T., Nguyen, Q. H., Hoang, T. M., Nguyen, K. T., Pham, T. T. M., Yang, S. H., Chao,

J. C. J., & Van Duong, T. (2020). People with suspected covid-19 symptoms were more likely depressed and had lower health-related quality of life: The potential benefit of health literacy. *Journal of Clinical Medicine*, *9*(4). https://doi.org/10.3390/jcm9040965

Ozamiz-Etxebarria, N., Idoiaga, M. N., Dosil, S.́ıa M., & Picaza, G. M. (2020). Psychologi- cal Symptoms During the Two Stages of Lockdown in Response to the COVID-19 Outbreak: An Investi- gation in a Sample of Citizens in Northern Spain. *Frontiers in Psychology*, *11*(1491).

Pan, L., Mu, M., Yang, P., Sun, Y., Wang, R., Yan, J., Li, P., Hu, B., Wang, J., Hu, C., Jin, Y., Niu, X., Ping, R., Du, Y., Li, T., Xu, G., Hu, Q., & Tu, L. (2020). Clinical characteristics of COVID-19 patients with digestive symptoms in Hubei, China: A descriptive, cross-sectional, multicenter study. *American Journal of Gastroenterology*, *115*(5), 766–773. https://doi.org/10.14309/ajg.0000000000000620

Panayiotou, G., Kokkinos, C. M., & Kapsou, M. (2014). Indirect and direct associations between personality and psychological distress mediated by disposi- tional coping. *The Journal of Psychology*, *48*(5), 549–567. https://doi.org/10.1080/00223980.2013.817375

Peres, I. T., Bastos, L. S. L., Gelli, J. G. M., Marchesi, J. F., Dantas, L. F., Antunes, B. B. P., Maçaira, P. M., Baião, F. A., Hamacher, S., & Bozza, F. A. (2021). Sociodemographic factors associated with COVID-19 in-hospital mortality in Brazil. *Public Health*, *192*, 15–20. https://doi.org/10.1016/j.puhe.2021.01.005

Peters, R. ., Solberg, M. ., Templin, T. ., & Cassidy-Bushrow, A. . (2020). Psychometric properties of the brief COPE among pregnant African American women. *West J Nurs Res.*, *42*(11). https://doi.org/10.1177/0193945920907686

Pinto, É. B., Maso, I., Nóbrega, R., Vilela, R., Santos, L. C., & Oliveira-filho, J. (2011). *Validation of the EuroQol quality of life questionnaire on stroke victims*. *69*, 320–323.

Potere, N., Valeriani, E., Candeloro, M., Tana, M., Porreca, E., Abbate, A., Spoto, S., Rutjes, A. W. S., & Di Nisio, M. (2020). Acute complications and mortality in hospitalized patients with coronavirus disease 2019: A systematic review and meta-analysis. *Critical Care*, *24*(1), 1–12. https://doi.org/10.1186/s13054-020-03022-1

Rao, S., Ali, K., Dennis, J., Berdine, G., Test, V., & Nugent, K. (2020). Analysis of Glucose Levels in Patients Hospitalized With COVID-19 During the First Phase of This Pandemic in West Texas. *Journal of Primary Care and Community Health*, *11*, 4–8. https://doi.org/10.1177/2150132720958533

Redd, W. D., Zhou, J. C., Hathorn, K. E., McCarty, T. R., Bazarbashi, A. N., Thompson, C. C., Shen, L., & Chan, W. W. (2020). Prevalence and Characteristics of Gastrointestinal Symptoms in Patients With Severe Acute Respiratory Syndrome Coronavirus 2 Infection in the United States: A Multicenter Cohort Study. *Gastroenterology*, *159*(2), 765-767.e2.

https://doi.org/10.1053/j.gastro.2020.04.045

Reisshauer, A., Baack, A., & Liebl, M. (2020). Physiotherapy in adult patients with suspected or proven COVID-19 at the Charité Universitätsmedizin Berlin. *Physical Medicine, Rehabilitation Medicine, Spa Medicine*, *30*(2), 64–65. https://doi.org/https://doi.org/10.1055/a-1147-7402

Richardson, S., Hirsch, J. S., Narasimhan, M., Crawford, J. M., McGinn, T., Davidson, K. W., Barnaby, D. P., Becker, L. B., Chelico, J. D., Cohen, S. L., Cookingham, J., Coppa, K., Diefenbach, M. A., Dominello, A. J., Duer-Hefele, J., Falzon, L., Gitlin, J., Hajizadeh, N., Harvin, T. G., … Zanos, T. P. (2020). Presenting Characteristics, Comorbidities, and Outcomes among 5700 Patients Hospitalized with COVID-19 in the New York City Area. *JAMA - Journal of the American Medical Association*, *323*(20), 2052–2059. https://doi.org/10.1001/jama.2020.6775

Rodriguez-Morales, A. J., Cardona-Ospina, J. A., Gutiérrez-Ocampo, E., Villamizar-Peña, R., Holguin-Rivera, Y., Escalera-Antezana, J. P., Alvarado-Arnez, L. E., Bonilla-Aldana, D. K., Franco-Paredes, C., Henao-Martinez, A. F., Paniz-Mondolfi, A., Lagos-Grisales, G. J., Ramírez-Vallejo, E., Suárez, J. A., Zambrano, L. I., Villamil-Gómez, W. E., Balbin-Ramon, G. J., Rabaan, A. A., Harapan, H., … Sah, R. (2020). Clinical, laboratory and imaging features of COVID-19: A systematic review and meta-analysis. *Travel Medicine and Infectious Disease*, *34*(February), 101623. https://doi.org/10.1016/j.tmaid.2020.101623

Rossi, R., Socci, V., Talevi, D., Mensi, S., Niolu, C., Pacitti, F., Di Marco, A., Rossi, A., Siracusano, A., & Di Lorenzo, G. (2020). COVID-19 Pandemic and Lockdown Measures Impact on Mental Health Among the General Population in Italy. *MedRxiv*. https://doi.org/10.3389/fpsyt.2020.00790

Rothan, H., & Byrareddy, Snjj. (2020). The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of Autoimmunity*, 102433.

Samlani, Z., Lemfadli, Y., Ait Errami, A., Oubaha, S., & Krati, K. (2020). The impact of the COVID-19 pandemic on quality of life and well-being in Morocco. *Archives of Community Medicine and Public Health*, *June*, 130–134. https://doi.org/10.17352/2455-5479.000091

Sharara, E., Akik, C., Ghattas, H., & Makhlouf Obermeyer, C. (2018). Physical inactivity, gender and culture in Arab countries: A systematic assessment of the literature. *BMC Public Health*, *18*(1), 1–19. https://doi.org/10.1186/s12889-018-5472-z

Simpson, R., & Robinson, L. (2020). Rehabilitation after critical illness in people with COVID-19 infection. *American Journal of Physical Medicine and Rehabilitation*, *99*(6), 470–474. https://doi.org/10.1097/PHM.0000000000001443

Sohrabi, M. R., Amin, R., Maher, A., Bahadorimonfared, A., Janbazi, S., Hannani, K., Kolahi, A. A., & Zali, A. R. (2021). Sociodemographic determinants and clinical risk factors associated with COVID-19 severity: a cross-sectional analysis of over 200,000 patients in Tehran, Iran. *BMC Infectious Diseases*, *21*(1), 1–13.

https://doi.org/10.1186/s12879-021-06179-4

Sommer, P., Lukovic, E., Fagley, E., Long, D. R., Sobol, J. B., Heller, K., Moitra, V. K., Pauldine, R., O'Connor, M. F., Shahul, S., Nunnally, M. E., & Tung, A. (2020). Initial Clinical Impressions of the Critical Care of COVID-19 Patients in Seattle, New York City, and Chicago. *Anesthesia and Analgesia*, *131*(1), 55–60. https://doi.org/10.1213/ANE.0000000000004830

Stierli, S., Buss, I., Redecker, H., Baumberger, M., Bläattler, E., Selb, M., Hinter, S., Ischer, B., & Schwegler, H. (2020). Insights from an interprofessional post-COVID-19 rehabilitation unit: A speech and language therapy and respiratory medicine perspective. *Journal of Rehabilitation Medicine*, *52*(9). https://doi.org/10.2340/16501977-2735

Taboada, M., Moreno, E., Cariñena, A., Rey, T., Pita-Romero, R., Leal, S., Sanduende, Y., Rodríguez, A., Nieto, C., Vilas, E., Ochoa, M., Cid, M., & Seoane-Pillado, T. (2021). Quality of life, functional status, and persistent symptoms after intensive care of COVID-19 patients. *British Journal of Anaesthesia*, *126*(3), e110–e113. https://doi.org/10.1016/j.bja.2020.12.007

Tahir ul Qamar, M., Alqahtani, S. M., Alamri, M. A., & Chen, L. L. (2020). Structural basis of SARS-CoV-2 3CLpro and anti-COVID-19 drug discovery from medicinal plants. *Journal of Pharmaceutical Analysis*, *10*(4), 313–319. https://doi.org/10.1016/j.jpha.2020.03.009

Thai, T. T., Le, P. T. V., Huynh, Q. H. N., Pham, P. T. T., & Bui, H. T. H. (2021). Perceived stress and coping strategies during the covid-19 pandemic among public health and preventive medicine students in vietnam. *Psychology Research and Behavior Management*, *14*, 795–804. https://doi.org/10.2147/PRBM.S317059

Thakur, V., & Jain, A. (2020). COVID 2019-suicides: A global psychological pandemic. *Brain, Behavior, and Immunity*, *88*(xxxx), 952–953. https://doi.org/10.1016/j.bbi.2020.04.062

The Lancet. (2020). Emerging understandings of 2019-nCoV. *The Lancet*, *395*(10221), 311. https://doi.org/10.1016/S0140-6736(20)30186-0

Tran, B. X., Vu, G. T., Latkin, C. A., Pham, H. Q., Phan, H. T., Le, H. T., & Ho, R. C. M. (2020). Characterize health and economic vulnerabilities of workers to control the emergence of COVID-19 in an industrial zone in Vietnam. *Safety Science*, *129*(May), 104811. https://doi.org/10.1016/j.ssci.2020.104811

Ulusoy, I. S., & Kal, Ö. (2020). Relationship Among Coping Strategies, Quality of Life, and Anxiety and Depressive Disorders in Hemodialysis Patients. *Ther Apher Dial.*, *24*(2), 189–196. https://doi.org/10.1111/1744-9987.12914.

van Doremalen, N., Bushmaker, T., Morris, D. H., Holbrook, M. G., Gamble, A., Williamson, B. N., Tamin, A., Harcourt, J. L., Thornburg, N. J., Gerber, S. I., Lloyd-Smith, J. O., de Wit, E., & Munster, V. J. (2020). Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *New England Journal of Medicine*, *382*(16), 1564–1567. https://doi.org/10.1056/nejmc2004973

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Cyrus, S. H., & Roger, C. H. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 Coronavirus Disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health*, *17*(5). https://doi.org/10.3390/ ijerph17051729

WHO. (2020a). Coronavirus Live Updates: WHO declares pandemic as number of infected countries grows. *New York Times*. https://www.nytimes.com/2020/03/11/world/coronavirus-news.html#link-682e5b06

WHO. (2020b). Disability considerations during the COVID-19 outbreak. *Bangladesh Physiotherapy Journal*, *10*(1), 1–22. https://doi.org/10.46945/bpj.10.1.04.07

WHO. (2020c). *Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)*. http://who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf

WHO. (2020d). WHO Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020. *World Health Orgnatization (WHO)*, *February*, 6–9. https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020

WHOQoL Group. (1993). Study protocol for the World Health Organization project to develop a Quality of Life assessment instrument (WHOQOL). *Quality of Life Research*, *2*, 153–159.

World Health Organization. (2020a). *Coronavirus disease (COVID-19) advice for public. 2020 [cited 30 Apr 2020]*.

World Health Organization. (2020b). Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. *Scientific Brief*.

World Health Organization. (2020c). *Transmission of SARS-CoV-2: implications for infection prevention precautions*.

World Health Organization. (2021). *Ghana becomes recipient of historic first shipment of COVAX vaccines*. 2021. https://www.afro.who.int/news/ghana-becomes-recipient-historic-first-shipment-covax-vaccines

Wu, C., Chen, X., Cai, Y., Xia, J., Zhou, X., Xu, S., Huang, H., Zhang, L., Zhou, X., Du, C., Zhang, Y., Song, J., Wang, S., Chao, Y., Yang, Z., Xu, J., Zhou, X., Chen, D., Xiong, W., … Song, Y. (2020). Risk Factors Associated with Acute Respiratory Distress Syndrome and Death in Patients with Coronavirus Disease 2019 Pneumonia in Wuhan, China. *JAMA Internal Medicine*, *180*(7), 934–943. https://doi.org/10.1001/jamainternmed.2020.0994

Yu, C., & Helwig, E. J. (2021). Role of rehabilitation amidst the COVID-19 pandemic: a review. *Journal of Translational Medicine*, *19*(1), 1–11. https://doi.org/10.1186/s12967-021-03048-1

Zhao, H., Shen, D., Zhou, H., Liu, J., & Chen, S. (2020). Guillain-Barré syndrome

associated with SARS-CoV-2 infection: causality or coincidence? *The Lancet Neurology*, *19*(5), 383–384. https://doi.org/10.1016/S1474-4422(20)30109-5

Zhou, J., & Tan, J. (2020). Diabetes patients with COVID-19 need better blood glucose management in Wuhan, China. *Metabolism: Clinical and Experimental*, *107*, 154216. https://doi.org/10.1016/j.metabol.2020.154216

Zhou, Yu, T., Du, R., Fan, G., Liu, Y., Liu, Z., Xiang, J., Wang, Y., Song, B., Gu, X., Guan, L., Wei, Y., Li, H., Wu, X., Xu, J., Tu, S., Zhang, Y., Chen, H., & Cao, B. (2020). Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *The Lancet*, *395*(10229), 1054–1062. https://doi.org/10.1016/S0140-6736(20)30566-3

8 APPENDICES

8.0 Appendix 1: Participants Information Sheet

Title: Assessment of the Quality of Life of COVID-19-Recovered Patients in a Major Treatment Centre in Accra.

Institution Affiliation: Department of Health Policy, Planning and Management: School of Public Health, College of Health Sciences, University of Ghana, Legon.

Introduction: Dear participant, my name is ESINAM AKU AMEDEWONU, a post-graduate student from the school of Public Health, University of Ghana. My phone number is 0208174787 and I can be reached via email at eamedewonu@yahoo.com.

Background and Purpose of research: I am conducting a study in this department to assess the Quality of Life of COVID-19 recovered patients at the Ghana Infectious Disease Centre (GIDC).

Nature of Research: This study will look at the standard of your health, comfort and well-being in the period following your recovery from COVID-19. It shall also investigate your coping strategies in that period as well as the influence of the healthcare system on your recovery. Hopefully, the information you give me will help in policy and planning for further management of COVID patients in Ghana especially with respect to post-recovery care, rehabilitation, and social integration.

Requirements: You will be required to fill out a simple questionnaire. This should take about 10-15 minutes of your time. This is purely academic research and the information given will be treated as confidential.

Benefits: You may not have any immediate or direct benefits from my interview, but your responses would be helpful in recommendations to appropriate authorities to help guide policy on post-discharge care and follow-up after COVID-19 infection, rehabilitation, and social support systems, as well as inform guidelines on Health Promotion.

Risks: The only inconvenience, if any that you would face by accepting to take part in this study perhaps is your time.

Compensation / Payment: There are no incentives/ payment for participating in this study.

Voluntary withdrawal: Participation in this study is voluntary. If you indeed decide to take part, you are at liberty to withdraw whenever you wish to and are also allowed to skip answering any of the questions that you are not very comfortable with.

Anonymity and Confidentiality: The information you would provide is going to be treated with strict confidentiality. Apart from my research team and members of the Ethics Committee, no body shall have access to the information since it shall be under lock and key. We also assure you that your name shall not appear or be mentioned in any report that will come out from this study.

Ethical approval: As part of our duty to conform with standard practice and to ensure your safety, ethical approval has been sought from the Ghana Health Service Ethics Review Committee in order to carry out this study.

Before taking Consent

Do you have any questions you wish to ask about the study? Yes ☐ No ☐

If yes, please, indicate the questions below

……

……

In case you have any questions later please, do not hesitate to contact:

1. **ESINAM AKU AMEDEWONU** Department of Health Policy Planning and Management, School of Public Health, University of Ghana. (Tel: 0208174787, Email: eamedewonu@yahoo.com)
2. **NANA ABENA APATU** Ghana Health Service Ethics Review Committee Administrator (Tel: 0503539896, Email: ethics.reseach@ghsmail.org) to make further clarification on ethical issues and your rights as participants if need be.

CONSENT FORM

STUDY TITLE: **ASSESSMENT OF THE QUALITY OF LIFE OF COVID-19 RECOVERED PATIENTS IN A MAJOR TREATMENT CENTER IN ACCRA**

PARTICIPANTS' STATEMENT

I acknowledge that I have read or have had the purpose and contents of the Participants' Information Sheet read and all questions satisfactorily explained to me in a language I understand English language / Ga / Twi. I fully understand the contents and any potential implications as well as my right to change my mind (i.e., withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name of Participant: …….

Participants' Signature: ……...OR Thumb Print……

Date: …….

INTERPRETERS' STATEMENT

I interpreted the purpose and contents of the Participants' Information Sheet to the afore named participant to the best of my ability in the English language / Ga / Twi language to his proper understanding.

All questions, appropriate clarifications sort by the participant and answers were also duly interpreted to his/her satisfaction.

Name of Interpreter: ……

Signature of Interpreter: ……. OR Thumb Print …….....

Date: ……

Contact Details: …….

STATEMENT OF WITNESS

I was present when the purpose and contents of the Participant Information Sheet was read and explained satisfactorily to the participant in the language, he/she understood English language / Ga / Twi.

I confirm that he/she was given the opportunity to ask questions/seek clarifications and same were duly answered to his/her satisfaction before voluntarily agreeing to be part of the research.

Name: ……

Signature: …….... OR Thumb Print …….....

Date: ……

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name: …….

Signature: …….

Date: …….

8.1 Appendix 2: Questionnaire

ASSESSMENT OF THE QUALITY OF LIFE OF COVID-19 RECOVERED PATIENTS IN A MAJOR TREATMENT CENTER IN ACCRA

Dear Respondent,

COVID-19 disease has ravaged the world globally since it was first detected in December 2019. It has greatly affected the lives of millions of people and led to devastating deaths worldwide affecting both the young and old. It has been shown to affect multiple organ systems but it's effects on health after recovery has not been fully investigated. This research is being carried out to thus assess the Quality of Life of COVID-19 Recovered Patients in a major treatment centre in Accra.

Hopefully, it will provide important information and data on the state of health of these individuals following recovery and discharge from isolation which will guide policies on post-discharge care and follow-up after COVID-19 infection, rehabilitation, and social support systems, as well as inform guidelines on Health Promotion.

You are assured that the answers you give will remain strictly confidential and your name will not be mentioned in our research reports.

Thank you.

Unique ID for Respondent ……

Date of interview ……

SECTION A: SOCIODEMOGRAPHIC FACTORS

Please answer each item by filling in as required or marking the appropriate box with a tick.

I. **What is your age?** ……. (at last birthday in years).

II. **What is your sex**?

☐ Male ☐ Female

III. What is your religion?

☐ Christian ☐ Muslim

☐ Traditionalist ☐Other*(specify):* ……

IV. What is your ethnicity?

☐ Ga-Dangme ☐ Ewe

☐ Akan ☐ Northern tribe

☐ Other *(specify):* ……

V. What is your marital status?

☐ Single ☐ Divorced

☐ Married ☐ Separated

☐ Co-habiting ☐ Widow/Widower

VI. **Where is your place of residence?** *(specify the name)*.....

☐ Rural ☐ Urban ☐Peri-urban

VII. What is the highest level of education you have attained?

☐ Primary ☐ Vocational/Technical

☐ Secondary ☐ None

☐ Tertiary ☐Other *(specify)*……

VIII. What is your occupation?

☐ Student ☐ Unemployed

☐ Formally employed ☐ Retired

☐ Informally employed ☐Other *(specify):* ……

IX. Are you a healthcare worker?

☐ Yes ☐ No

*If **YES** what specialty?*

☐ Doctor ☐ Nurse

☐ Physician assistant ☐ Pharmacist

☐ Physiotherapist ☐Other *(specify):* ……

SECTION B: QUALITY OF LIFE [EQ-5D-5L QUESTIONNAIRE]
Under each heading, please tick the ONE box that best describes your health over the period (from 2weeks after your first positive COVID result until now).

MOBILITY

☐ I have had no problems in walking about

☐ I have had slight problems in walking about

☐ I have had moderate problems in walking about

☐ I have had severe problems in waling about

☐ I have been unable to walk about

SELF-CARE

☐ I have had no problems washing or dressing myself

☐ I have had slight problems washing or dressing myself

☐ I have had moderate problems washing or dressing myself

☐ I have had severe problems washing or dressing myself

☐ I have been unable to wash or dress myself

USUAL ACTIVITIES *(e.g., work, study, housework, family, or leisure activities)*

☐ I have had no problems doing my usual activities

☐ I have had slight problems doing my usual activities

☐ I have had moderate problems doing my usual activities

☐ I have had severe problems doing my usual activities

☐ I have been unable to do my usual activities

PAIN / DISCOMFORT

☐ I have had no pain or discomfort

☐ I have had slight pain or discomfort

☐ I have had moderate pain or discomfort

☐ I have had severe pain or discomfort

☐ I have been in extreme pain or discomfort

ANXIETY / DEPRESSION

☐ I was not anxious or depressed

☐ I was slightly anxious or depressed

☐ I was moderately anxious or depressed

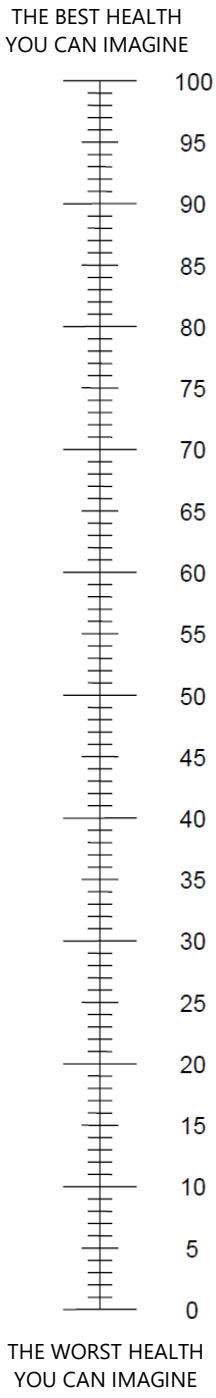
☐ I was severely anxious or depressed

☐ I was extremely anxious or depressed

(II) EQ VAS

- We would like to know how good or bad your health OVER THE PERIOD has been
- This scale is numbered from 0 to 100.
- 100 means the best health you can imagine.

  0 means the worst health you can imagine.
- Please mark an X on the scale to indicate how your health has been
- Now, write the number you marked on the scale in the box below



YOUR HEALTH OVER THE PERIOD HAS BEEN = ☐

SECTION C: HEALTH CARE SYSTEM, PERSISTENCE OF SYMPTOMS AND ACCESS TO REHABILITATIVE SERVICES

Please answer each item by filling in as required or marking the appropriate box with a tick.

1. **Does your primary health care facility offer COVID-19 treatment/isolation services?**

   ☐ Yes ☐ No

   *If **YES** which facility?*

   ……

   *If **NO** which facility, were you referred to for COVID-19 management?*

   ……

2. **Where you able to receive all covid 19 treatment medications from your treatment centre?**

   ☐ Yes ☐ No

   *If **NO**, which medications did you have to go and buy?*

   .....

   .....

   .....

3. **Did you incur any financial costs during your COVID-19 management period?**

   ☐ Yes ☐ No

   *If **YES**, what accounted for it?*

   ☐ Length of stay in hospital ☐ Required ventilatory support

   ☐ Cost of medications ☐ Cost of laboratory investigations

   ☐ Others *(please specify)*: .....

4. **Which mode of treatment did you require?**

   ☐ Hospital admission ☐ Self-isolation at home

5. **Did you have any persistent symptoms after 30 days following the initial diagnosis of COVID?**

☐ Yes ☐ No

*If **YES**, which symptoms did you have? (Tick as many as apply)*

☐ Headache ☐ Memory loss

☐ Muscle aches ☐ Hair loss

☐ Cough

☐ Chest pain

☐ Ageusia (loss of taste)

☐ Anosmia (loss of smell)

☐ Attention disorder (inability to focus)

☐ Abdominal pains

☐ Extreme fatigue (tiredness)

☐ Dyspnoea (difficulty breathing / shortness of breath)

☐ Easy fatiguability (tiredness on minimal exertion)

☐ Rigors – feeling cold with shivers and sudden rise in temperature

☐ Fever

☐ Sleep disorders (e.g., insomnia)

☐ Nausea & vomiting

☐ Diarrhoea

☐ Others *(please specify)*:

6. **Do you have any comorbid conditions (chronic diseases present prior to suffering COVID)?**

☐ Yes ☐ No

*If **YES** which condition?*

☐ Diabetes ☐ Hypertension

☐ Sickle cell disease ☐ Asthma

☐ Obesity ☐ Chronic lung disease (Emphysema, bronchitis)

☐ Kidney disease ☐ Dyslipidaemia

☐ Other *(specify):* ……

7. **Did you have any comorbidities which worsened or was difficult to manage following your COVID-19 infection?**

☐ Yes ☐ No

*If **YES**, which conditions?*

☐ Diabetes ☐ Hypertension

☐ Sickle cell disease ☐ Asthma

☐ Kidney disease ☐ Chronic lung disease (Emphysema, bronchitis)

☐ Dyslipidaemia ☐ Migraine

☐ Other *(specify):* ……

8. **Did you have any complications following your COVID-19 infection?**

☐ Yes ☐ No

*If **YES**, which complications?*

☐ Post-traumatic stress disorder (PTSD) ☐ Stroke/CVA

☐ Pulmonary embolism ☐ DVT

☐ Neurological deficit ☐ Myocardial infarction (heart attack)

☐ Difficulty mobilizing/walking ☐ Acute kidney injury

☐ Others *(specify):* .....

.....

9. **Did you require rehabilitative services post discharge?**

☐ Yes ☐ No

*If **YES**, which services did you require?*

☐ Chest Physiotherapy ☐ Limb physiotherapy

☐ Psychiatry/Psychologist ☐ Neurology (speech, stroke)

☐ Others *(please specify):* .....

.....

10. Did you have access to a rehabilitative centre?

☐ Yes ☐ No

*If **YES**, which services were rendered?*

☐ Chest Physiotherapy ☐ Limb physiotherapy

☐ Psychiatry/Psychologist ☐ Neurology (speech, stroke)

☐ Others *(please specify):* .....

.....

*If **NO**, why?*

☐ Did not require it

☐ Was not told

☐ No rehabilitation facility available

☐ It was too expensive to afford

☐ It was too far away to assess

☐ I did not know where to assess such services

☐ Others *(please specify):* .....

.....

SECTION D: COPING STRATEGIES IN THE POST-COVID PERIOD [Brief-COPE]

The following questions ask how you sought to cope after recovery from COVID-19 infection (2weeks after your first positive COVID result). Read the statements and indicate by ticking the appropriate box how much you used each coping style

		I didn't do this at all	A little bit	A medium amount	I did this a lot
1	I turned to work or other activities to try to take my mind off my current challenges / getting COVID.	**1**	**2**	**3**	**4**
2	I concentrated my efforts on doing something about the situation I am in / getting COVID.	**1**	**2**	**3**	**4**
3	I kept saying to myself "this isn't real".	**1**	**2**	**3**	**4**
4	I used alcohol or other drugs to make myself feel better	**1**	**2**	**3**	**4**
5	I got emotional support and advice from others (e.g. family, friends, therapist, etc.).	**1**	**2**	**3**	**4**
6	I gave up trying to deal with the challenges / the fact that I had COVID.	**1**	**2**	**3**	**4**
7	I took action to try to make the situation better / try to recover from COVID.	**1**	**2**	**3**	**4**
8	I refused to believe that I had gotten COVID.	**1**	**2**	**3**	**4**
9	I said things to myself to let my unpleasant feelings / emotions escape (self-motivation).	**1**	**2**	**3**	**4**
10	I got help and advice from other people (e.g., family, friends, therapist, etc.)	**1**	**2**	**3**	**4**
11	I used alcohol or other drugs to help me get through it.	**1**	**2**	**3**	**4**
12	I tried to see the challenges /situation in a different light, to make it seem more positive.	**1**	**2**	**3**	**4**
13	I criticized myself.	**1**	**2**	**3**	**4**
14	I tried to come up with a strategy about what to do.	**1**	**2**	**3**	**4**
15	I got comfort and understanding from someone.	**1**	**2**	**3**	**4**
16	I gave up the attempt to cope.	**1**	**2**	**3**	**4**

		I didn't do this at all	A little bit	A medium amount	I did this a lot
17	I looked for something good in what had happened.	**1**	**2**	**3**	**4**
18	I made jokes about COVID.	**1**	**2**	**3**	**4**
19	I engaged in activities to think about it less, such as going to the movies, watching TV, reading, daydreaming, sleeping, or shopping.	**1**	**2**	**3**	**4**
20	I accepted the reality of the fact that I got infected with COVID.	**1**	**2**	**3**	**4**
21	I expressed my negative feelings by letting my emotions out e.g., crying.	**1**	**2**	**3**	**4**
22	I tried to find comfort in my religion or spiritual belief's	**1**	**2**	**3**	**4**
23	I tried to get advice or help from other people (e.g., family, friends, therapist, etc.).	**1**	**2**	**3**	**4**
24	I learnt to live with the challenges / fact that I got infected with COVID.	**1**	**2**	**3**	**4**
25	I thought hard about the steps to take during my recovery.	**1**	**2**	**3**	**4**
26	I blamed myself for getting COVID	**1**	**2**	**3**	**4**
27	I prayed or meditated	**1**	**2**	**3**	**4**
28	I made fun of COVID.	**1**	**2**	**3**	**4**

THANK YOU FOR TAKING TIME TO FILL THE QUESTIONNNAIRE

8.2 Curriculum Vitae

Esinam Aku Amedewonu

MB ChB, DAWACS, MGCS, MWACS

Department of Anaesthesia, Korle Bu Teaching Hospital, P. O Box KB 20, Korle Bu, Accra
+233 (0)20 8174787 anastasia_4eva@yahoo.com | eamedewonu@yahoo.com

PERSONAL STATEMENT

Talented certified anaesthesiologist who is versatile, hardworking, and meticulous with an exceptional attitude towards work. Offering over 10 years of experience in the hospital setting with a broad level of expertise and a primary focus in pain and regional anaesthesia. Skilled leader, critical thinker, a team player with outstanding interpersonal skills and ability to relate with people from diverse backgrounds. Demonstrate success in providing basic anaesthesic care to elective and emergency surgeries to a wide range of patients from healthy individuals to critically ill patients as well as sedation procedures for adults and children requiring radiological intervention. Skilful in administering anaesthesia to various specialties: general surgery, neurosurgery, paediatric surgery, obstetrics and gynaecology, plastics, urology, otorhinolaryngology, maxillofacial surgery, ophthalmology, and orthopaedics surgery. Excellent skills in managing critically ill patients in the intensive care unit. Well-organised, enthusiastic, motivated to learn and excel in leadership opportunities with a long-standing record of success and safety.

PROFESSIONAL QUALIFICATIONS

2020	**Membership (MWACS)**	West African College of Surgeons
2019	**Membership (MGCS)**	Ghana College of Physicians and Surgeons
2017	**Diploma in Anaesthesia (DAWACS)**	West African College of Surgeons
2015	**Full Accreditation with license to practise [MDC/RN/08190]**	Medical and Dental Council of Ghana
2013	**Bachelor of Medicine and Surgery (MB ChB)**	University of Ghana Medical School

EDUCATION

Date	Institution	Qualification obtained (or in pursuit of)
2020 to date	**School of Public Health,** University of Ghana, Legon	Master of Public Health (in progress)
2020 to date	**Ghana College of Physicians and Surgeons**	Fellowship in Anaesthesia (in progress)
2017 – 2019	**West African College of Surgeons**	Membership
2017 – 2019	**Ghana College of Physicians and Surgeons**	Membership
2015 – 2017	**West African College of Surgeons**	Diploma in Anaesthesia
2009 – 2013	**University of Ghana Medical School**	Bachelor of Medicine and Surgery
2007 – 2010	**University of Ghana,** Legon	Bachelor of Medical Sciences
2002 – 2005	**Achimota School,** Accra	West African Examinations Council (WAEC) Senior Secondary Certificate Examination (SSSCE)
1991 – 2001	**Christ The King International School,** Accra	WAEC Basic Education Certificate Examination (BECE)

EMPLOYMENT HISTORY

Date	Position	Institution
Sep 2019 to date	**Specialist**	**Department of Anaesthesia,** *Korle Bu Teaching Hospital*
Sep 2017 – Aug 2019	**Senior Medical Officer**	**Department of Anaesthesia,** *Korle Bu Teaching Hospital*
Sep 2015 – Aug 2017	**Medical Officer**	**Department of Anaesthesia,** *Korle Bu Teaching Hospital*
	Job Roles Undertaken at the Department of Anaesthesia: • Administration and assisting in anaesthetic care • Management of Intensive Care Unit • Training of junior residents and medical officers • Pre-operative assessment of patient for surgery • Peri-operative preparation of patients for surgery • Morbidity and mortality report • Participation in weekly departmental presentation and scientific seminars • Management of severe and critically ill COVID-19 patients at the UGMC, GIDC, and Ga East Municipal Hospital	
Nov 2014 – Apr 2015	**Senior House Officer**	**Department of Surgery,** *Tema General Hospital* Job Roles Undertaken: • In-patient and outpatient care • Assist in surgical procedures in theatre • Provide emergency surgical care to patients at the surgical emergency • Monthly morbidity and mortality reports
May 2014 – Oct 2014	**Senior House Officer**	**Department of Child Health,** *Tema General Hospital* Job Roles Undertaken: • In-patient and outpatient care • Parents counselling sessions • Presentation at weekly clinical meetings
Nov 2013 – Apr 2014	**House Officer**	**Department of Obstetrics and Gynaecology,** *Korle Bu Teaching Hospital* Job Roles Undertaken: • In-patient and outpatient care • Operative and non-operative deliveries • Assist in gynaecological procedures and surgeries • Weekly review writing reports • Monthly morbidity and mortality reports
May 2013 – Oct 2013	**House Officer**	**Department of Medicine and Therapeutics,** *Korle Bu Teaching Hospital* Job Roles Undertaken: • In-patient and outpatient care • Preparing weekly review summaries • Morbidity and mortality reports

KEY COMPETENCIES

General Anaesthesia	Well versed in general anaesthesia for major general surgical cases
Plastics & Reconstructive surgery	Specialised competencies in anaesthesia for Plastics & Reconstructive surgeries
Obstetrics & Gynaecological	Specialised competencies in anaesthesia for Obstetrics & Gynaecological surgeries
Orthopaedics	Specialised competencies in anaesthesia for Orthopaedic surgeries
Ophthalmology	Specialised competencies in anaesthesia for Ophthalmic surgeries
Paediatric surgery	Specialised competencies in anaesthesia for Paediatric surgery
Maxillofacial	Specialised competencies in anaesthesia for Maxillofacial surgeries
Urological	Specialised competencies in anaesthesia for Urological surgeries
ENT	Specialised competencies in anaesthesia for otorhinolaryngology surgeries
Neuro Anaesthesia	Specialised competencies in anaesthesia for major neurosurgical cases
Pain	Knowledge in regional anaesthesia and analgesia. Ability to perform regional anaesthetic techniques/blocks for pain control
ICU	Experienced in intensive care management of severely/critically ill patients
Knowledge in Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS)	
Knowledge in Difficult Airway management	
Knowledge in Intensive Care Unit Management of Critically ill patients	

SELECTED WORKSHOPS, CONFERENCES, SEMINARS

Dec 2020	**Paediatric Advanced Life Support,** *MSSI, Accra* Completed a course requirement for certification in Paediatric Advanced Life Support
28 – 30 Nov 2020	**Euroanaesthesia Virtual Congress**, *Brussels, Begium (Online)* Awarded a full bursary to attend Euroanaesthesia Virtual Congress held on 28-30th November in Brussels (Belgium) and organised by the World Federation of Societies of Anaesthesiologists and the European Society of Anaesthesiology and Intensive Care
Sep 2019	**Advanced Cardiovascular Life Support,** *MSSI Accra* Completed the course requirement for certification in Advanced Cardiovascular Life Support (ACLS)
Jul 2019	**Evidence-Based Medicine Course,** *Ghana College of Physicians and Surgeons, Accra* Participant of an evidence-based course by the Ghana College of Physicians and surgeons. This program sensitized participants to the value, concept and practice of evidence-based medicine, while enriching capacity in the application of Systematic reviews

May 2019	**International Intensive Care Symposium,** *Istanbul, Turkey* The 22nd Annual International Intensive Care Symposium held in Istanbul provided participants with an up-to-date review of the most recent developments in research and management of the critically ill, of which I was a beneficiary
Sep 2017 – Sep 2019	**Presenter/Moderator**, *Department of Anaesthesia, KBTH, Accra* Moderated and led several seminars and presentations at the Department of Anaesthesia, which included: Temperature control and monitoring in anaesthesia; Nursing for the critically ill patient; Sedation for minor procedures; Anaesthesia for Phaeochromocytoma, among others.

CONTINUING MEDICAL EDUCATION (CME) PROGRAMMES ATTENDED

Date	TOPIC	RESOURCE(S) TEAM / PERSONS
August 2022	Pelvic pain	The European Society of Regional Anaesthesia and Pain Therapy
July 2022	Pain Webinar	Ghana Anaesthetists Society
October 2020	Pain Webinar	Ghana Anaesthetists Society
February 2020	Basic Sciences Instrumentation & Clinical Measurements	WACS (Anaesthesia)
February 2020	Perioperative Ethical Dilemmas	Ghana Anaesthetists Society
February 2019	Principles & Practice of Anaesthesia (Revision)	WACS (Anaesthesia)
Feb – March 2018	Basic Sciences, Instrumentation & Clinical Measurements	WACS (Anaesthesia)
Feb 2017	Principles & Practice of Anaesthesia (Revision)	WACS (Anaesthesia)
April 2016	Essentials of Airway Management	Dept. of Anaesthesia, KBTH
Feb – March 2016	Basic Sciences, Instrumentation & Clinical Measurements	WACS (Anaesthesia)

VOLUNTEER WORK/EXTRA-CURRICULAR ACTIVITIES

Mar – Dec 2020	**National COVID-19 ICU Team** Part of the National Covid-19 ICU team responsible for the management of severely and critically ill Covid-19 patients in Ghana. This was at the early stage of the COVID-19 outbreak in Ghana and the world when very little was known about the disease and the earliest cases in Ghana were making it into the healthcare facilities
Dec 2018 to date	**Member, Ripples ARP** Ripples ARP is a local based organisation which is involved in advocacy programs, research and health promotion. Through this organisation, I have participated in several peer group counselling sessions, and collaborated in some ongoing studies
2018 to date	**Member, Ghana Hepatobiliary Association**
2019 to date	**Member, Operation SMILE Ghana Anaesthetists Team**
Apr 2017 to date	**Member, Ghana Anaesthetist's Society**
Dec 2012 to date	**Health Advocate** I have rendered many pro-bono talks and screening sessions in the form of outreaches to at least 20 churches, schools and communities
May 2012 – May 2013	**Volunteer, Global Brigades Ghana** Global Brigades are groups of passionate volunteers who mobilize toward positive social change. For one year I was part of its medical team offering free medical services to deprived villages. Global Brigades is the world's largest student-led global health and sustainable development organization. Since 2004, Global Brigades has mobilized thousands of university students and professionals through skill-based service programs to improve quality of life in under resourced communities
May 2010	**Member of the Organizing Committee** Member of the organizing committee and participant in the Annual Congress of the Federation of Ghana Catholic Health Trainees. This congress saw the adoption of more institutions into the Federation and held an outreach at Mayera (one of the six communities in the Amasaman sub district in the Greater Accra region). Statistics and reports from informants working there prior to the Congress, indicated that most of the pregnant women in the community were at high risk of maternal mortality. From the Congress, Mayerah benefited from massive educative campaigns on Maternal Mortality, Clinic sessions with over 2000 people screened, some treated, and others referred to Health centres
2006 – 2012	**Member, University of Ghana Medical Students' Association**
2006 – 2012	**Member, International Movement of Catholic Students- Pax Romana**

HOBBIES

Reading
Swimming
Watching medical and scientific movies
Dancing Ballet Jazz, Tap, Contemporary and HipHop

REFEREES

Dr Fred Osei
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8.3 Ethical Clearance

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

My Ref. GHS/RDD/ERC/Admin/App 21/329
Your Ref. No.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Digital Address: GA-050-3303
Mob: +233-50-3539896
Tel: +233-302-681109
Fax + 233-302-685424
Email: ethics.research@ghsmail.org
13th August, 2021

Esinam Aku Amedewonu
School of Public Health,
College of Health Science
University of Ghana, Legon

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	**GHS-ERC 029/07/21**
Project Title	Assessment of the quality of Life of COVID-19 Recovered Patients in a Major Treatment Center in Accra.
Approval Date	13th August, 2021
Expiry Date	12th August, 2022
GHS-ERC Decision	**Approved**

This approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.
- Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
Dr. James Akazili
(Head, Ethics & Research Management Department)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra