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Meaning in life and wellbeing in persons suffering from chronic disease in Cape Town, South Africa.

Student Name: Anja Bedeker

Student Number: 3939159

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Department: Department of Psychology

Primary Supervisor: Professor Kelvin Mwaba

Co-Supervisor: Mr Kyle Jackson

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But there was no need to be ashamed of tears, for tears bore witness that a man had the greatest of courage, the courage to suffer – **Viktor Frankl**

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do better, be better, be kinder and love stronger. I would not be the person I am, if he was not my father. Thank you.

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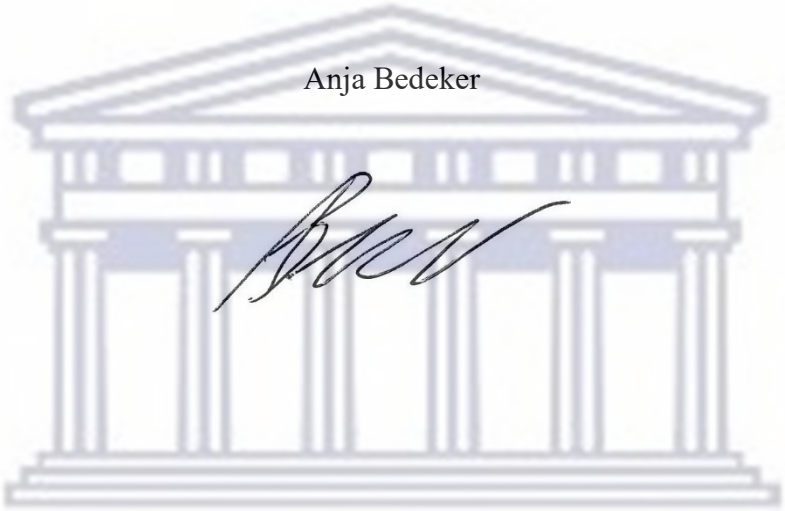
Between stimulus and response there is a space. In that space is our power to choose our response. In our response lies growth and our freedom. Life is never made unbearable by circumstances, but only by lack of meaning and purpose **– Viktor Frankl**

Declaration

I declare that the research: *Meaning in life and wellbeing in persons suffering from chronic disease in Cape Town, South Africa* has not been submitted before for any degree, or examination at any other university. All the sources I have used or quoted have been indicated and acknowledged as complete references.

Anja Bedeker



Abstract

Chronic diseases are the leading cause of mortality, morbidity and disability and its prevalence continues to increase. Chronic disease can impact every dimension of a person's life (physical, psychological, social, spiritual, financial, etc.) and yet research on chronic disease typically focuses on the disease itself and treatment plans rarely include psychological treatment. People are living longer, but they are also living with disability and poor health for longer. Chronic disease can also significantly impact an individual's meaning in life (MIL). Meaning in life increases wellbeing and has a protective function. But it is not only the presence of meaning in life (POM) that is important, but also the search for meaning in life (SFM). Research on MIL and its association with subjective well-being (SWB) has predominantly focused on "healthy" populations. Usually this investigation explores this association with POM and if SFM is also investigated, the interactional effect between POM and SFM is not considered. The aim of this study was to investigate the relationship between POM and SFM and (1) subjective wellbeing (SWB) and (2) certain demographic variables in persons with chronic disease.

This exploratory study utilised a quantitative, cross-sectional survey design. Nonprobable, purposive sampling was used to recruit participants at Tygerberg Hospital. After obtaining informed consent, participants were asked to complete a questionnaire. The questionnaire consisted of a biographical section, the Meaning in Life Questionnaire and the Oxford Happiness Questionnaire. The Pearson's product correlation, Kendall's tau and Kruskal-Wallis one-way analysis of variance was used to conduct initial tests of association between the three primary variables and the demographic variables. Hybrid hierarchical k-means cluster analysis was used to identify naturally occurring clusters within the POM and SFM data. One-way independent analysis of variance was the used to investigate the relationship between the

POM/SFM clusters and SWB. Ethics clearance for the study was obtained from the Biomedical Research Ethics Committee of the University of the Western Cape, the Western Cape Department of Health and Tygerberg Hospital. All ethics principles were followed, including informed voluntary consent, increasing benefits (e.g. providing participants with individualised feedback on the results of their questionnaires) and minimising possible harms (e.g. Covid-19 protocols were followed to ensure the participants' safety).

The findings suggest that persons who experience their lives as lacking meaning, also experience lower SWB. It further suggests that POM may act as a buffer against possible negative outcomes of a high SFM. The results seem to reveal that experiencing one's life as absent of meaning, is associated with a stressful search, which negatively impacts SWB. Further research, using a larger sample size and employing a stratified sampling method (to ensure the sample is representative of South Africans living with chronic illness), is needed to validate and verify the results of the study. There needs to be a greater emphasis on the wellbeing of people suffering from chronic disease. Merely focusing on the physiological health of patients and using treatments that may extend patients' lifespan is not sufficient. The psychological health of persons with chronic disease should be considered and must form part of any treatment plan.

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Chapter One: Introduction

1.1. Background

The average life expectancy (number of years a person in expected to live) and the average healthy life expectancy (the number of years a person is expected to live in full health, i.e. without serious disease and/or dissability) globally (73.3 years and 63.7 respectively) and in Africa (64.3 years and 56.2 years respectively) continues to increase (World Health Organization, 2022b). However, healthy life expectancy is increasing at a slower rate than life expectancy, i.e. people are living longer, but they are also living with dissability and poor health for longer (World Health Organization, 2022b). In South Africa, the average life expectancy is 65.3 years, while healthy life expectancy is only 56.2 years (World Health Organization, 2022b). Therefore, on average, South African's live with severe disease and/or disability for 9.1 years. Chronic diseases, also known as non-comunicable diseases (NCD), are the leading causes of mortality, morbidity and disability worldwide, accounting for 73.6% of deaths globally (World Health Organization, 2022b).

There is no single accepted definition of chronic disease, globally or within South Africa (Adjaye-Gbewonyo & Vaughan, 2019; Bernell & Howard, 2016). Most commonly, chronic diseases are considered non-comunicable diseases (non-infectious, i.e. cannot be passed from one person to another) which last for an extended period of time (there is no consensus on how long) for which there is no cure but the condition can be managed and these diseases are typically degenerative (the severity of the disease increases over time) in nature (Adjaye-Gbewonyo & Vaughan, 2019; Bernell & Howard, 2016; Karki, 2019; Meetoo, 2014; Raghupathi & Raghupathi, 2018; Tecson et al., 2019; S. Thomas et al., 2023). The most prevalent chronic diseases in South Africa are cardiovascular diseases (e.g. coronary artery disease,

cardiomyopathy, myocardial infarction), cancer, type 2 diabetes mellitus, respiratory diseases (e.g. chronic obstructive pulmonary disease, asthma,) and mental health disorders (Samodien et al., 2021).

Exact statistics on the prevalence of chronic diseases in South Africa does not currently exist as most hospitals do not keep accurate records (Ross, 2016); chronic diseases are underdiagnosed (Kamerman, 2022) and there are very few studies on the prevalence of chronic diseases in South Africa (Abdelatif et al., 2021). The best prevalence estimates available are found in Statitics South Africa's (Stats SA) mortality and causes of death in South Africa report (Statistics South Africa, 2021), and the general household survey (GHS) report (Statistics South Africa, 2022).

According to the latests Stats SA report on mortality and causes of death, 59.3% of all deaths in South Africa in 2018 were caused by non-communicable diseases (Statistics South Africa, 2021). Seven of the ten leading underlying natural causes of death in South Africa in 2018 were NCD's. Diabetes mellitus was the second leading natural underlying cause of death (5.9%), followed by cerebrovascular disease in third (5.1%), "other forms of heart disease" was forth (5.1%), hypertensive diseases were sixth (4.5%), ischaemic heart diseases eight (3%), chronic lower respiratory diseases ninth (3%) and malignant neoplasms of digestive organs tenth (2.4%) (Statistics South Africa, 2021). It should be noted that when all heart diseases are placed in the same category, heart disease accounts for 12.6% of deaths. This is more than twice that of deaths due to Tuberculosis at 6%, which is reported as the leading cause of death in the report.

The GHS (Statistics South Africa, 2022) report showed that 895 000 South Africans have been diagnosed with asthma, 1.7 million with diabetes (the type of diabetes is not specified), 153 000 with cancer, 4.8 million with hypertension, 976 000 with arthritis (the type of arthritis is

not specified) and 197 000 with stroke.

The mortality and causes of death in South Africa report should however be interpreted within context and with extreme caution. First, the publication reports on mortality rates, not the prevalence of persons living with specific diseases. Secondly, the latest report was released in 2021, but is based on death notifications from 2018. Lastly, there is significant concern regarding the reliability and accuracy of the results due to methodological problems, specifically the method of ascertaining the cause of death (Statistics South Africa, 2021). Less than a quarter of the causes of death were ascertained through autopsy (7.6%) and post mortem examinations (17.3%), 19.7% of the causes of death were ascertained through the "opinion" of registered medical professionals (doctors 11.8%; nurses 7.9%) (Statistics South Africa, 2021). The remaining 55.3% of causes of death were ascertained through "Interview of family member" (0.7%), "other" (0.9%) and "unspecified" (53.7%). This means that for the majority of the data the sources are either inappropriate (family member) or are not known. The GHS should also be interpreted with caution due to several methodological limitations (see, for example, pages 64 to 65), especially the small sample size which is generalised to the entire South African population using population estimates (Statistics South Africa, 2022).

According to the World Health Organisation (WHO) (World Health Organisation, 2005; World Health Orginization, 2006), 80% of deaths due to chronic disease occur in Low- and Middle Income Countries (LMIC's). Chronic diseases are the leading cause of death world wide, serve as is the main cause of illness in adults globally and the prevalence of chronic disease is increasing. Approximately, 45% of people in the United States of America suffer from at least one chronic disease (Raghupathi & Raghupathi, 2018). Gijsen et al. (2016) reported a 6.9% increase in the prevalence of chronic illness in the Netherlands, from 34.9% in 2004 to 41.8% in

2011.

South Africa has the highest income inequality in the world and this inequality is reflected in South Africans' access to healthcare and quality of healthcare (Burger & Christian, 2020). Socio-economically disadvantaged individuals make use of public health care services more regularly and are more likely to post-pone seeking healthcare when compared to individuals from more afluent backgrounds. Socio-economically disadvantaged individuals are more likely to have difficulty affording health care and medication and are less likely to be able to afford private medical aid. Most importantly, socio-economically disadvantaged individuals are more likely to experience poor health (Nwosu & Oyenubi, 2021) and to experience poor health outcomes (Gordon et al., 2020; Schneider et al., 2009). Chronic diseases usually require long term treatement and disease management to slow down the progression of the disease and to assist with symptom relief. This, however, is not possible without easy access to affordable, quality healthcare (Burger & Christian, 2020; Schneider et al., 2009). The higher risk of chronic disease, coupled with significant barriers to access quality healthcare has made an already vulnerable group (socio-economically disadvanataged), even more vulnerable and with little resources to protect themselves from severe disease and dissability.

The progression, symptoms and severity of symptoms of chronic diseases differ from disease to disease. Typically, chronic diseases are characterised by severe pain (e.g. rheumatoid arthritis, fibromyalgia, osteoarthritis, cancer, addison's disease, cardiovascular disease), fatigue, muscle stiffness, breathing difficulty, anemia, etc. (Papadakis et al., 2022; Tecson et al., 2019). Due to these and other symptoms, chronic disease can impact every dimension of a person's life and their subsequent daily functioning (Kemp et al., 2022). For example, a person living with chronic pain caused by multiple sclerosis, may experience functional limitations or an inability to

perform certain actvities; such as an inability to walk for prolonged periods of time, stretch, pick up objects, walk up stairs, or dressing themselves. This will impact the physical dimension of their functioning. It may also impact the emotional dimension of their functioning due to being in constant pain and/or the loss of autonomy through needing assistance to complete daily tasks; it may also impact the social dimension of their functioning as they are unable to or in too much pain to partake in social activities; and it may impact the financial dimension of their functioning due to a loss of work productivity (Hadi et al., 2019; Kemp et al., 2022).

Several studies have found that the presence of chronic disease, functional limitations and/or chronic pain due to chronic disease and/or the impact of the disease on interpersonal relationships are associated with an increased risk of suicide in adults (Kaplan et al., 2007; Kim, 2016; Scott et al., 2010; Wilson et al., 2013) and adolescents (Greydanus et al., 2010). De-Graft Aikins et al. (2010) explain that chronic disease can have a negative impact on the individual's "physical capabilities, social identities and life trajectories" (p. 3) and has been associated with depression, chronic unhappiness, spiritual distress, psychiatric illness and suicidal ideation. This can be further exaserbated if the disease leads to poverty (due to cost of treatment, inability to work due to illness, etc.). Poverty in turn limits the individual's access to healthcare which leads to worsening of the disease, its prognosis and the impact on the individual's functioning (i.e. social, financial, emotional, physical, spiritual).

Chronic disease has a detrimental impact on an individual's health and wellbeing. Health and good health are often misconstrued as only referring to the absence of ill-health. However, it also refers to the presence of positive health. This is reflected in the WHO's constitution in which they define health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 2002, p. 984). As with

health, wellbeing is often misconstrued as the "absence of distress" (Kemp et al., 2022, p. 2). However, similar to health, wellbeing is not merely the absence of distress, but also the presence of a positive emotional state. The associations between chronic disease and wellbeing are well established (Kemp et al., 2022). Poor wellbeing has been identified as a risk factor for certain chronic diseases (including cardiovascular diseases, type 2 diabetes mellitus and chronic obstructive pulmonary disease) (Almeida et al., 2020; Kemp et al., 2022). Chronic disease has been associated with poor wellbeing and chronic disease severity has been found to have a negative association with wellbeing. Inversely, higher levels of wellbeing have been associated with improvements in diseases prognosis, increased treatment compliance, greater acceptance and increased quality of life (Almeida et al., 2020; Daré et al., 2019; Kemp et al., 2022; L.-X. Liang et al., 2022; Zhu et al., 2017).

Chronic disease can also significantly impact an individual's meaning in life (Krok & Gerymski, 2019). "Meaning in life gives (MIL) people a reason to live and a basis to make sense of their life experiences – past, present and future" (Steger, 2022a, p. 389). MIL, therefore, helps an individual make sense of his/her chronic disease and serves a protective function. As Frankl said, "He, who has a why to live for, can bear with almost any how" (Frankl, 2008, p. 84). MIL can be discovered in three ways, namely the things we do (creative values), uplifting things we experience (experiential values), and one's attitude towards suffering (attitudinal values) (Frankl, 2008; Meyer et al., 2008). Creative values refer to work and deeds that make an individual feel meaningfully part of life. Experiential values refer to experiencing something, for example beauty, truth and goodness (Frankl, 2008; Meyer et al., 2008). The greatest and most powerful experience is love, "experiencing another human being in his [or her] very uniqueness (Frankl, 2008, p. 115). The last, attitudinal values, refers to an individual's attitude to towards suffering.

Suffering is an inevitable part of human existence and cannot always be avoided. In those circumstance the individual is "challenged" to change him/herself and find meaning in their circumstance, as Frankl (2008) famously wrote "[w]hen we are no longer able to change a situation— just think of an incurable disease such as inoperable cancer —we are challenged to change ourselves" (p. 116).

Chronic disease can have an negative impact on experiential sources due to the negative impact it can have on interpersonal relationships and possible limiting of opportunities to experiencing things such as beauty and goodness. It can also negatively impact creative source due to physical and/or cognitive limitations caused by chronic disease (Hadi et al., 2019; Kemp et al., 2022; Papadakis et al., 2022). Chronic disease does, however, offer the opportunity to find meaning in suffering. When explaining the meaning of suffering Frankl wrote, "In some way, suffering ceases to be suffering at the moment it finds a meaning, such as the meaning of a sacrifice" (Frankl, 2008, p. 117).

Much of the literature focuses on having or not having MIL, i.e. the presence of MIL (Michalos, 2014). Frankl believed that the *will to meaning* (the yearning to find MIL) is the most powerful human motivation, in other words seeking meaning (Frankl, 2008). It, therefore, stands that the search for meaning in life (SFM) is as important as the actual presence of meaning in life (POM) and should also be investigated.

1.2.Rationale

Despite the prevalence and alarming increase in the prevalence of chronic disease in South Africa and other LMIC's, funding (from both national and international donors) into research, prevention, control and treatment of chronic diseases in LMIC's have been neglected (Daré et al., 2019; Jailobaeva et al., 2021). The impact of chronic disease on psychological and

psychosocial health, the effects of improving mental health has on disease management and outcome and possible psychological therapeutic interventions that can be used to minimise the effects of chronic diseases have received even less focus and funding (Daré et al., 2019; Jailobaeva et al., 2021; Kruger et al., 2023).

Wong (as cited in Michalos, 2014) posited that MIL served at least three important purposes; it contributes to wellbeing, it functions as a protective and preventative factor and as hope in hopeless circumstances. In an earlier paper, Wong (2012b) explained that MIL helps people make sense of their suffering and makes suffering more tolerable. Therefore, MIL is imperative to individuals suffering from chronic disease. Understanding the relation between POM and SFM and wellbeing will expand current understandings on how these three factors influence and interact with one another, specifically within the South African context. It will allow for the creation of therapeutic interventions that effectively improve all three constructs and for improving the wellbeing and general psychological health of persons suffering from chronic disease.

This study is significant because it will add to the current literature base to further guide the development and construction of psychological interventions/therapies for persons living with chronic disease. Currently, access to psychological interventions and therapies in South Africa is limited to a small portion of the population because these services typically require the skills of advanced trained, licenced professionals in one-on-one modalities (Manco & Hamby, 2021). However, meaning-centred interventions (e.g. mindfulness and narrative programmes) can be conducted by registered or lay-counsellors to increase MIL. Determining the link between MIL and wellbeing in individuals with chronic disease may encourage further study and ultimately lead to the creation of meaning-centred group interventions/therapies that are tailored

to help persons with chronic diseases to find greater meaning in their lives and thereby increase their wellbeing.

1.3.Problem statement

The effects of chronic disease on wellbeing and mental illness have been studied extensively in high-income countries (Cadman et al., 1987; De-Graft Aikins et al., 2010; Iaquinta & McCrone, 2015; Krok & Gerymski, 2019), yet it is rarely included in the treatment plan of chronic diseases (Dezutter et al., 2013; Krok & Gerymski, 2019; Ostovar et al., 2022; Turner & Kelly, 2000). Medical advancements may have led to people with chronic diseases living longer, but what is their overall quality of that life? Due to the debilitating nature of chronic diseases (both physical and psychological), the individual may no longer be able to perform the activities/tasks or pursue the goals that gave meaning to their lives, that gave their life purpose (Frankl, 2008; Hadi et al., 2019; Kemp et al., 2022; Papadakis et al., 2022). A lack of meaning and/or purpose in life has been associated with maladaptive psychosocial functioning (Dezutter et al., 2014) and depression (Krok & Gerymski, 2019; Reker, 1997). The POM, however, has been associated with and, in some studies, predicted positive psychological wellbeing (Dezutter et al., 2013; García-Alandete, 2015) and self-efficacy (Blażek et al., 2015; Krok & Gerymski, 2019). The majority of studies on MIL have focused on "healthy" individuals, though there has been some focus on patients living with cancer (Cheng et al., 2023; Nkoana et al., 2022; Smit et al., 2021; Visser et al., 2010; Winger et al., 2016). There was a large scale study conducted in the Netherlands that included all chronic diseases (Dezutter et al., 2013), but no such studies have been conducted in South Africa.

There is a dearth of research on chronic diseases in South Africa and Africa as a whole, specifically when compared to the amount of research conducted on communicable diseases (C.

Wang et al., 2019). African governments also spend little of their health care budgets on chronic disease interventions and treatments (C. Wang et al., 2019). This is especially concerning as early detection and intervention is crucial to patient quality of life and disease outcomes (Papadakis et al., 2022; Smit et al., 2021). Screening for certain conditions can even prevent the development of several chronic diseases. Given the above, this study is needed to gain greater understanding of the impact MIL has on the wellbeing of people suffering from chronic diseases (Bovet et al., 2015; Pashayan et al., 2018; Siegel et al., 2020; U S Preventive Services Task Force, 2021; World Health Organization, 2022a).

1.4. Research questions

1. What is the relationship between POM and SFM and wellbeing in persons with chronic disease?
2. What is the relationship between POM and SFM and demographic variables of persons with chronic disease?

1.5. Aim of the study

The aim of the study is to investigate the relationship between presence of meaning in life and search for meaning in life, wellbeing and certain demographic variables in persons with chronic disease(s) in Cape Town, South Africa.

1.6. Objectives

The objectives that guided the study are:

1. To measure the levels of POM and SFM of participants with chronic disease.
2. To measure the level of wellbeing of participants with chronic disease.
3. To determine the relationship between POM and SFM and (a) wellbeing and (b) demographic variables of participants with chronic disease.

1.7. Structure of the thesis

This chapter offered the background, motivation, rationale and aims for this study. Chapter two: Literature review provides a review of the literature on meaning in life from the perspective of the existential school of thought as well as two dimensions of meaning in life, namely presence of and search for meaning in life. This is followed by a discussion on wellbeing, the different approaches to wellbeing and then a focus specifically on subjective wellbeing. Chapter two also includes a review of some of the literature on chronic disease and a discussion on how it relates to meaning in life and subjective wellbeing. The chapter will end with a short discussion on the theoretical framework of the study.

Chapter three: Method, provides the context within which the study was conducted. It will also offer an examination of the psychometric properties of the instruments used to measure POM, SFM, wellbeing and various demographic variables. Thereafter the analysis procedure and statistical analyses are described. The chapter will end with a discussion of the ethics of the study. Chapter four: Results, presents the findings of the statistical analyses conducted as guided by the stated research questions, objectives and hypotheses indicated in chapter one. Chapter five: Discussion, interprets and discusses the results, as well as the implications of the findings. The findings are then compared to the findings from previous research. It ends with a discussion of the limitations of the study and recommendations for future research.

Chapter Two: Literature review

This chapter offers a review of existing national and international literature on MIL, wellbeing and chronic diseases. Each construct is defined and discussed individually and accompanied by studies that either offer a deeper understanding of the construct or relates it to the other constructs. Literature on populations with chronic diseases and healthy populations are included but the former will be emphasised. The rationale for the inclusion of the specific demographic variables included in the questionnaire are also substantiated in this chapter. National research on the relationship between MIL and wellbeing is limited and few have focused on this relationship in persons with chronic diseases, therefore, both national and international studies are included. The chapter ends with a discussion on the theoretical framework of the study and how all the different constructs tie together.

2.1. Meaning in Life

Research on MIL has increased significantly over the past few decades due to the rise of existentialism, a shift in focus towards positive psychology (Pavot & Diener, 2008; Steger, 2022b; Wong, 2012b) and the realisation of the importance of MIL to psychological health (Manco & Hamby, 2021; Martela & Steger, 2016). This increase has also led to a variety, and sometimes conflicting theories, definitions and operationalisations of MIL (Martela & Steger, 2016; Reker & Chamberlain, 2000; Steger, 2016, 2022a, 2022b; Steger et al., 2006; Winger et al., 2016). Some researchers approach MIL with an over simplified unidimensional model, while others use multidimensional approaches, such as Wong's four components of meaning model (Martela & Steger, 2016; Wong, 2010).

For the purpose of this study, an existential approach to MIL was adopted due to its approach to humans. The existential approach views people as more than slaves to their drives,

biology, experiences, etc. Instead people are considered to have free will and to have the capacity to make their own choices and take responsibility for their own lives. There is a focus on positive psychology in terms of not emphasising the chronic illness itself but instead emphasising the individual's attitudinal response to it (Meyer et al., 2008; Wong, 2012a). Steger et al. (2006) attempted to combine the most prominent definitions of existential MIL into a single succinct definition. They defined it as "the sense made of, and significance felt regarding, the nature of one's being and existence" (Steger et al., 2006, p. 81). Later, Steger (2016) expanded on this definition stating that:

> "*meaning in life is the set of subjective judgements people make that their lives are (a) worthwhile and significant, (b) comprehensible and make sense, and (c) marked by the embrace or pursuit of one or more highly valued, overarching purposes or missions*." (p. 961)

There are several aspects to unpack from these definitions. 'Worthwhile and significant' refers to an individual perceiving that his/her life matters; a life that matters, is a life worth living (Steger, 2016). 'Comprehensible and make sense' is the cognitive dimension of meaning. It alludes to the need for order; enough of the individual's life needs to be predictable and consistent to enable development of the self, relationships and the ability to navigate everyday life; chaos, nonsense and confusion does not allow this (Steger, 2016). The last judgement, purpose, is often used interchangeably with the term MIL, however, they are separate concepts (Martela & Steger, 2016). Purpose refers to the individual's core goals/aspirations in life, the individual's ultimate mission in life (Martela & Steger, 2016; Steger, 2016). MIL refers to two more important inferences that can be drawn from Steger et al. (2006) and Steger's (2016) definitions of this construct. First, both definitions indicate the need for both cognitive and

affective evaluations and lastly, MIL refers to an individual's ultimate meaning, or stated differently, the perceived meaning for the individual's existence. Every day activities and goals by themselves are, therefore, not inherently meaningful. Instead its meaning is derived from how it contributes to attaining or sustaining one's ultimate meaning.

The best way to understand meaning, and thereby also MIL is to imagine a world absent of meaning (Steger, 2016). Life, and by extension suffering, would have no purpose. Relationships and human interaction would not add joy to life as they would be meaningless. Working hard to reach a goal, playing a sport, painting a portrait, building a model train, skydiving, cooking, etc. would serve no purpose as people would not experience them as meaningful activities or pursuits. The meaning attached to relationships, objects and activities is what makes them fulfilling and important (Frankl, 2008; Steger, 2016).

The want for MIL is universal, however, there is no universal manifestation of MIL (Frankl, 1965). What is experienced as meaningful will differ from person to person and change over time. Sources of meaning are also heavily influenced by sociocultural factors (Nell, 2014a). Although sources of meaning do not form part of this study, offering some background on this, within the South African context, allows for deeper insight. In Nell's (2014a) study with university students, he found that the most important sources of MIL was close personal relationships (family, friends, romantic partners) followed by hope, goals and future plans and achievement and success. Other sources included education, religion and personal growth and development (Nell, 2014a). Another study conducted with South African students found similar results with the three main sources of meaning being relationships, education and religion (Mason, 2014).

In the current study, both the presence of (POM) and search for meaning (SFM) in life

was investigated. SFM in life refers to an individual seeking to find existential meaning in their life whereas POM in life refers to an individual's perception that existential meaning is present in their life. POM and SFM are separate, yet related constructs. They are distinct from one another, but are not opposites. The following two sections offer a deeper explanation of these two concepts.

2.1.1. Presence of meaning in life

POM refers to "the extent to which people comprehend, make sense of, or see significance in their lives, accompanied by the degree to which they perceive themselves to have a purpose, mission, or over-arching aim in life" (Steger et al., 2009, p. 43)

POM has been associated with various indicators of positive psychological health. Within international research it has been found to be positively associated with an orientation to happiness (individuals that seek wellbeing through pleasure, meaning, and engagement) (Steger et al., 2009), life satisfaction (Park et al., 2010; Steger et al., 2009), happiness (Park et al., 2010; Steger et al., 2009) and positive affect (Park et al., 2010; Steger et al., 2009). It has also been found to have an inverse relationship with negative affect (Park et al., 2010; Steger et al., 2009) and depression (Park et al., 2010; Steger et al., 2009). A study conducted in Switzerland in 2020 with patients at a psychiatric emergency department found a negative correlation between POM and suicidal ideation, having a psychiatric diagnosis and a diagnosis of a past major depressive disorder (Costanza et al., 2020).

Within the South African context, POM has been found to have a mild to moderate positive relationship with religious fundamentalism and a strong correlation with life satisfaction (Nell, 2014b). It was also found to have a negative correlation with SFM.

2.1.2. Search for meaning in life

Historically MIL research has focused predominantly on the POM, however over the past two decades there has been a shift towards focusing on the SFM as well (Costanza et al., 2020; Steger et al., 2008). Frankl (1965, 2008) frequently used the term "will to meaning" (the need to find meaning and purpose in life) to explain that finding meaning in life is the primary motivational force behind human behaviour. Therefore, investigating the *search* for meaning is as important as the actual *presence* of meaning.

Steger et al. (2008) defined SFM as the "strength, intensity, and activity of people's desire and efforts to establish and/or augment their understanding of the meaning, significance, and purpose of their lives" (p. 200). Therefore, the term "search for meaning in life" does not denote a singular concept, but rather consists of several dimensions. It incorporates the importance (strength, intensity and activeness) of finding meaning and the manner in which the individual attempts to find meaning (identify and incorporate new possible sources of meaning and/or change one's understanding/perception of the meaningfulness of existing aspects and/or factors in his/her life).

The role of SFM on human functioning continues to be debated. Some scholars argue that SFM is part of normal human functioning/development, others argue that it causes or is symptomatic of dysfunctionality (Costanza et al., 2020; Steger, 2016; Steger et al., 2008). There is a large body of research that has found SFM to be associated with poor mental health indicators (e.g. depression, anxiety). In international research SFM has been found to be negatively associated with life satisfaction (Park et al., 2010; Steger et al., 2009), happiness (Park et al., 2010; Steger et al., 2009), and positive affect (Park et al., 2010; Steger et al., 2009). It has also been found to have a positive association with negative affect (Park et al., 2010; Steger et al., 2009) and depression (Park et al., 2010; Steger et al., 2009). Similarly, research in

South Africa has found SFM to have an inverse association with life satisfaction (Nell, 2014b),

Although these finding lend support to the argument that SFM is indicative of dysfunctionality, Costanza et al. (2020), Steger (2016) and Steger et al. (2008) have proposed that the role SFM has on functioning should not be considered without taking POM into account. Consider the following scenario: two individuals are actively searching for meaning in life. However, the one individual perceives his/her life as absent of meaning, whereas the other experiences his/her life as meaningful but is searching for more meaning. It is important to explore the difference in life satisfaction between the two and whether a difference exists in terms of their overall quality of life.

It is for this reason that investigating SFM and POM and examining their collective effects are so crucial. There have been some studies that followed this approach. Park et al. (2010) found that SFM negatively correlated with SWB, however they found that SFM was positively associated with wellbeing for participants that experienced a high level of POM. They concluded that to understand the impact SFM has on people requires investigating the combined effect of SFM and POM.

2.2. Wellbeing

There are multiple definitions of wellbeing but at the broadest and most basic level wellbeing can be viewed as "the good life" (Michalos, 2014, p. 2838). How the good life is understood and operationalised depends on the theoretical approach adopted. Theories on wellbeing can broadly be divided into Eudaimonic and Hedonic approaches (Adams et al., 2016; Fadiji & Wissing, 2022).

2.2.1. Eudaimonic and hedonic approaches to wellbeing

Eudaimonic wellbeing. Eudaimonic wellbeing originated from Aristotle's concept of

eudaimonia which he described in Nichomachean Ethics (written in 350 BCE) (Lee et al., 2021; Michalos, 2014). Eudaimonia is a Greek term which consists of "eu", which translates to good, and "daimon", which translates to indwelling spirit, genius (Michalos, 2014). For Aristotle eudaimonia referred to the "the fulfillment of one's true nature" (Michalos, 2014, p. 2000), i.e. fulfilling your true potential. However, this is not just in reference to individual potential, but also to fulfilling socially shared goals (Lee et al., 2021; Michalos, 2014; Ryan & Deci, 2001). Modern interpretations of eudaimonia differ from that of Aristotle's, but can to some extent be considered an extension of his definition. Today, depending on the source used, it refers to "the interaction between the individual and the environment" (Michalos, 2014, p. 2000) and the "quality of life of a person as a whole" (Michalos, 2014, p. 2000).

There are several different models of eudaimonic wellbeing. A review by Martela and Sheldon (2019) identified 63 different constructs used in 45 different operationalizations of eudaimonic wellbeing. Possibly the most well-known model was proposed by Carol Ryff (Cromhout et al., 2022). Ryff's (1989) model consists of six dimensions namely, self-acceptance (accepting and having a positive attitude towards oneself), positive relationships with others (warm, loving, trusting, caring relationships and the ability to empathise with others), environmental mastery (control over and ability to change one's environment favorably and the ability to take and/or create opportunities), autonomy (self-determination, independence, the ability to think and act based on one's own values and standards and the ability to resist social pressures), purpose in life (presence of goals, sense of directedness, and perceiving one's present and past life as meaningful) and personal growth (continuous development of one's potential and oneself).

Hedonic wellbeing. The word hedonism originates from the ancient Greek word

"hedone" which translates to pleasure (Lee et al., 2021; Michalos, 2014). Hedonic wellbeing is predominantly defined in terms of pleasure and positive and negative affect and is, therefore, often used synonymously with the word happiness (Lee et al., 2021; Michalos, 2014; Ryan & Deci, 2001). From a hedonic approach, the maximization of pleasurable experiences and the minimization or avoidance of negative experiences lead to the greatest levels of wellbeing (Lee et al., 2021; Ryan & Deci, 2001).

During its early use, hedonic wellbeing had a narrow focus only concerned with physical or sensory pleasures but has overtime broadened in scope and can now also include psychosocial pleasures, self-interests and all pleasant feelings and emotions (Michalos, 2014; Ryan & Deci, 2001).

Eudaimonic wellbeing and hedonic wellbeing are two distinct theories and there is significant debate on which theory is the most accurate, however, there are also researchers that view the two approaches as complementary (Rahmani et al., 2018; Ryan & Deci, 2001). Where hedonic wellbeing focusses on short-term pleasure and happiness, eudaimonic wellbeing focusses on the long term outcomes of self-growth and self-actualization (Rahmani et al., 2018). It is, therefore, argued that wellbeing is best approached as a multidimensional phenomenon which incorporates both eudaimonic and hedonic concepts (Lee et al., 2021; Ryan & Deci, 2001).

2.2.2. Subjective wellbeing

Subjective wellbeing (SWB) is an exemplar of hedonic wellbeing and can be viewed as an operationalization of hedonic wellbeing (Thrash, 2021). In this study wellbeing was defined in terms of SWB. SWB is concerned less by objectively defined environments (e.g. wealth, job, family) and rather focuses on the individual's subjective experience of these defined

environments (Lee et al., 2021). This approach is sensible as the presence or absence of environmental factors are not a reliable indicator of an individual's quality of life; how the individual experiences or perceives his/her environment is what determines his/her quality of life (Michalos, 2014).

SWB can be defined as "a person's cognitive and affective evaluations of his or her life" (Diener et al., 2009, p. 63). SWB, therefore, consists of two dimensions, namely a cognitive and affective or experiential dimension (Diener et al., 2009; Lee et al., 2021; Michalos, 2014). Cognitive evaluations refer to the individual's assessment of his/her satisfaction with their life overall. Affective or experiential evaluations, in contrast, refer to the individual's experience of positive and negative emotions. A high satisfaction with one's life in combination with the presence of positive affect and absence of negative affect is indicative of a high level of SWB. It is important to note that positive and negative affect are not opposite sides of a single continuum. Positive affect and negative affect have been found to be independent of one another and are, therefore, measured individually. An individual can experience a high level of positive affect and a high level of negative affect at the same time, and vice-a-versa (Diener & Emmons, 1984; Robinson et al., 2020).

SWB comprises of three components, namely life satisfaction, positive affect and negative affect (Diener et al., 2009; Lee et al., 2021; Martela & Sheldon, 2019; Medvedev et al., 2017; Michalos, 2014; Ryan & Deci, 2001; Wissing, 2013). Positive affect refers to the experience of pleasant emotions (e.g. happiness, excitement, satisfaction), whereas negative affect refers to the experience of unpleasant emotions (e.g. sadness, anger, frustration) (Snyder et al., 2021). Life satisfaction, the cognitive dimension of SWB, is the individual's evaluation of how satisfied he/she is with their life overall, both past and present (Bidzan-Bluma et al., 2020).

SWB refers to the individual's perception or subjective experience of these three constructs (Bidzan-Bluma et al., 2020; Snyder et al., 2021).

Internationally, SWB has been researched extensively, including the benefits of high SWB and the possible harms of low SWB (Diener et al., 2018; Michalos, 2014; Nowak-Olejnik et al., 2022; Stenlund et al., 2022). There is also research on SWB with South African populations. Research with South African children, for example, has shown a strong positive association between SWB and social relationships (Savahl et al., 2020, 2022). Low SWB has been found to be a predictor of burnout (Hansen et al., 2015). SWB has also been found to correlate positively with job satisfaction (Hansen et al., 2015) and agency and hope (Nell & Rothmann, 2018).

2.3. Chronic disease

There is such a significant number of chronic diseases that it would be impractical to discuss all of them and, therefore, this section will only focus on the three most common chronic diseases in South Africa, namely cardiovascular disease, cancer and type 2 diabetes mellitus (Samodien et al., 2021). Chronic diseases have a negative impact on a person's physiological *and* mental health. Poor mental health in turn can worsen the disease and/or disease symptoms, this in turn has a further negative impact on the person's mental health, and the cycle continues (Meetoo, 2014). Poor mental health can even increase the individual's risk of disease specific mortality (Zhu et al., 2017). Despite this, mental health interventions are rarely included in treatment regimens or considered when deciding on a course of treatment (Gao et al., 2019; Kemp et al., 2022).

Cancer can have a detrimental effect on wellbeing. Cancer has been associated with reduced emotional well-being (Linden et al., 2012; Miovic & Block, 2007; Niedzwiedz et al.,

2019), increased anxiety and depressive symptoms (Linden et al., 2012; Miovic & Block, 2007; Niedzwiedz et al., 2019) and psychological disorders, including mood disorders (especially depression) (Dai et al., 2023; Linden et al., 2012; Miovic & Block, 2007; Niedzwiedz et al., 2019; Ostovar et al., 2022; Russell et al., 2022; Zhu et al., 2017), anxiety disorders (Dai et al., 2023; Linden et al., 2012; Miovic & Block, 2007; Niedzwiedz et al., 2019; Ostovar et al., 2022; Russell et al., 2022; Zhu et al., 2017), substance abuse disorders (Zhu et al., 2017) and posttraumatic stress disorder (Swartzman et al., 2017). Persons diagnosed with cancer are also more likely to attempt/commit suicide compared to the general population (Henson et al., 2019; Niedzwiedz et al., 2019; S. M. Wang et al., 2018). MIL has been found to have a positive correlation with SWB (Visser et al., 2010) and a negative correlation with distress in cancer patients (Visser et al., 2010; Winger et al., 2016). POM and, interestingly SFM, have both been found to have a positive correlation with spiritual wellbeing in patients with gastrointestinal cancer (Cheng et al., 2023).

Cardiovascular diseases are progressive diseases, i.e. the disease worsens over time and the afflicted individual's health will continue to deteriorate (Krok & Gerymski, 2019). The association between cardiovascular disease and mental illness is well established. Coronary artery disease (CAD), for example, has been associated with depression (severe depressive episodes and persistent depressive disorder), anxiety disorders (agoraphobia, panic disorder and hypochondria) and a significant decrease in psychosocial functioning (L.-X. Liang et al., 2022; Schaich et al., 2018). Individuals suffering from cardiovascular disease are three times more likely to suffer from depression than the general public. Anxiety and depression has a bidirectional relationship with cardiovascular disease, i.e. anxiety and depression increases the risk of developing cardiovascular disease and cardiovascular disease increases the risk of

developing anxiety and depression. However, the bidirectionality is also linked to the severity of depression and anxiety on cardiovascular disease rather than simply the presence of it and vice-a-versa (Chaddha et al., 2016). Higher wellbeing, conversely, has been associated with a decreased risk of cardiovascular disease and reduced incidents of cardiovascular mortality (Davidson et al., 2010; Kubzansky et al., 2001, 2018; Sin, 2016; Tindle et al., 2009). MIL in cardiovascular patients have been found to be possitively associated with self-efficacy, life satisfaction, and positive affect and negatively associated with negative affect (Krok & Gerymski, 2019).

As with cardiovascular disease, there are well established associations between type 2 diabetes mellitus (T2DM) and depression and anxiety. Depression is more prevalent in persons with T2DM, compared to the general population (AlBekairy et al., 2017; Alzahrani et al., 2019; Ducat et al., 2014; Holmes-Truscott et al., 2016; Roy & Lloyd, 2012), is a major risk factor for T2DM, is associated with nonadherence to T2DM treatment (Ducat et al., 2014; Gonzalez et al., 2008; Mukherjee & Chaturvedi, 2019; Nanayakkara et al., 2018) and worse T2DM prognosis (Ducat et al., 2014; Nanayakkara et al., 2018). The relationship between T2DM and depression also appears to be bidirectional (Mukherjee & Chaturvedi, 2019). Individuals with T2DM are also at an increased risk of suffering from anxiety (AlBekairy et al., 2017; Ducat et al., 2014; Grigsby et al., 2002) and/or eating disorders (Ducat et al., 2014). The emotional distress caused by T2DM is so significant and prevalent, that researchers and practitioners now use the term "diabetes distress" to refer to this (Fisher et al., 2018; Nanayakkara et al., 2018; Sultana et al., 2022). Individuals living with T2DM report lower levels of SWB compared to the general population and even lower levels of SWB for those using insulin (Holmes-Truscott et al., 2016). MIL has been found to be a protective factor against death anxiety and promotes quality of life and health outcomes in persons with T2DM (Aliche et al., 2023).

Studies that have focused on chronic diseases as a collective have found persons with physical chronic disease to be two to three times more likely to also suffer from major depressive disorder (MDD), and MDD to have a prevalence rate of 20-40% in persons with physical chronic diseases (Almeida et al., 2020). A meta-analysis on the co-morbidities of mental disorders and chronic physical diseases in LMIC's found a high prevalence, 36.6%, of anxiety and/or depression in persons with physical chronic diseases (Daré et al., 2019).

Considering the literature on the three most prevalent chronic diseases in South Africa, there is sufficient evidence that indicates increasing the wellbeing of people with chronic diseases may alleviate some of the distress caused by the disease. There is also sufficient evidence to suggest that it may also have a positive effect on the prognosis of the disease.

2.4. Theoretical framework

Existential analysis is the theoretical framework for Logotherapy and is the framework that was used for the current study. Parker (as cited in Michalos, 2014) explains "an existential analysis–orientated approach toward practical life culminates with the discovery of existential meaning (personal meaning)" (p. 2070). The three main tenets of existential analysis are freedom (to choose one's attitude), responsibility (for one's own life) and search for meaning in life and this culminates into the theoretical foundation of logotherapy, namely living a "whole" life (existence). To live a fulfilled existence, one must have an affirmative attitude "to the world, to life, to one's unique personhood, and to the contextual meaning of an event or situation" (Parker, 2014, p. 2071).

Logotherapy (also referred to as existential analytical psychotherapy and existential therapy) is a form of psychotherapy. Existential analysis is the theoretical foundation of logotherapy (Parker, 2014). The fundamental principal of logotherapy is that, "life holds

meaning under all circumstances and that meaning can be experienced by anyone at any time and anywhere" (Meyer et al., 2008, p. 442). Although individuals may not always have control over their physical circumstances/environment, they still have the freedom to choose their attitude. Human beings have a unique ability to find meaning, even in the worst of suffering. Viktor Frankl (2008) (the creator of logotherapy) believed that an individual can find meaning in suffering, that he/she could not only endure suffering but could face suffering with courage. "The moment suffering has a reason, it loses its unbearable quality and it becomes another one of life's tasks, one which – because it asks so much of us – offers us the opportunity to achieve moral greatness" (Meyer et al., 2008, p. 450). Logotherapy considers suffering as part of what it means to be human. Frankl hypothesised that an individual who is sick wants to be healthy again, not because health is the "ends," but rather because health is the "means" to resume life with loved ones and to pursue the activities that gave meaning to their life. Frankl further explained that it is not the absence of good health that causes frustration but rather ill health that "hampers the person's search for meaning" (Meyer et al., 2008, p. 447).

The pervasive and debilitating nature of chronic diseases is why an existential analysis approach is so applicable. The person is confronted with an existence that challenges their attitude to life, the world and their being. They are challenged to discover the meaning in their suffering.

The main critisims of the existential analysis framework is its highly philosophical nature. It is argued that this makes empirical investigation of the theory difficult (Carducci et al., 2020; Laengle, 2015). It is also criticised for not fully considering the psychodynamics and non-spiritual dimensions of humans (Laengle, 2015).

Although Existentialism forms the theoretical framework for this study, much of the

design and theoretical support for the study was derived from Dezutter, et. al.'s (2013) research on the relationship between POM and SFM and wellbeing of persons with chronic diseases. Dezutter, et al., (2013) found that it is not only the POM that influences wellbeing, but a combination of POM and SFM.

2.5. Chapter summary

In summary, both local and international research demonstrate the importance of MIL and SWB in human functioning and their individual contributions to positive psychological health. The POM contributes to positive psychosocial health and acts as a protective factor against mental illness, poor psychological health and negative events. Research on the effect of SFM has generally shown SFM to have an inverse association with positive mental health indicators, but there is some research to suggest this association is not as clear-cut, and that POM may mediate the effect of SFM on SWB. The literature also indicated the relationship between SWB and positive psychological outcomes.

There is an abundance of literature on the association between chronic diseases and poor psychological health and mental illness. The literature reveals that chronic diseases are associated with poor mental health and certain chronic conditions increase an individual's risk of developing psychological illness. On the other side, poor mental health and psychological illness is a risk factor for the development of certain chronic diseases and can further exacerbate disease symptoms, decrease treatment adherence and negatively impact disease prognosis. MIL, however, has been shown to have a positive impact on the psychological health of persons with certain chronic conditions. Increased SWB has been shown to have a positive effect on disease prognosis and mortality.

Chapter Three: Method

This chapter will explain the scientific basis of the methodology of the study; including the study design, the setting in which the study was conducted and the sampling strategy employed. It also includes a discussion of the measures that were used for data collection including the psychometric properties of the measures. This is followed by an in-depth explanation of the statistical methods that were used during data analysis, along with the scientific justification for their use. The chapter ends with the ethical considerations of the study.

3.1. Research design

The study followed a positivist paradigm and a quantitative, cross-sectional survey, correlational design was employed. In a cross-sectional study, observations (e.g. by using a questionnaire) are made of a sample of the research population of interest at a single point in time (Babbie, 2021; C. G. Thomas, 2021). As the observations are made at a single point in time, causality cannot be established. Correlational designs are a type of nonexperimental study design in which two or more variables (which have not been manipulated by the researcher) are measured to identify the existence of a relationship between the variables and to determine the "nature, degree, magnitude, and strength" of the relationships (Salkind, 2010; Thomas, 2021, p. 72).

Additionally, the purpose of the research was predominantly exploratory. "Exploratory studies are used to make preliminary investigations into relatively unknown areas of research" (Terre Blanche et al., 2006, p. 44) and to determine whether there are relationships between the different variables within this unknown area. As the association between MIL and SWB in persons with chronic diseases has not been investigated within the South African context, the current study was exploratory in nature.

3.2. Research setting

Participants were recruited at Tygerberg Hospital in Parow from patients that were awaiting medical treatment. Tygerberg Hospital is a public hospital and the largest hospital in the Western Cape (Western Cape Government, n.d.) with a total of 1386 beds (du Toit et al., 2019). It serves persons from the Northern Metro sub-districts, Khayelitsha, Eastern Tygerberg, the West Coast, the Cape Winelands and Overberg rural districts which is home to over 3.4 million people (Western Cape Government, n.d.). Tygerberg Hospital was selected as the research setting due to the large number of people it serves, it offers several specialist services which are required by persons with chronic diseases and it predominantly serves persons from lower socioeconomic groups (Allwood et al., 2020). Persons' from lower socioeconomic groups are disproportionately affected by chronic diseases and typically have less access to treatment resources.

The specific hospital wards/units where data was collected was purposely not specified, as this could cause a violation or unnecessary intrusion of participants' privacy. Data was also not collected on the specific chronic condition or conditions the participants were diagnosed with, as this is sensitive and highly confidential information and participants may have experienced it as an intrusion of their privacy. It should be noted, that there are circumstances under which collecting such data could be justified and, therefore, would be ethical. However, for this study, there was no scientific justification for collecting such high risk data as it would not have offered any substantial additional depth to the study and was not needed to answer any of the research questions (Gristina et al., 2023; Oliver, 2010; Paoletti et al., 2013; Shamoo & Resnik, 2022).

3.3. Research population and sampling

All research participants were 18 years or older, were fluent in English and had been diagnosed with a chronic disease by a registered health care practitioner. The measurement instruments that were used are written in English and, therefore, including participants that were not fluent in English may have led to inaccurate data, biased results and would violate ethical standards.

Purposive nonprobability sampling, also known as judgement sampling was used to recruit the participants. In purposive sampling, participants are selected based on having the characteristics of the target population (Babbie, 2021; Gideon, 2012; Salkind, 2010; C. G. Thomas, 2021). This method of sampling was used as participants needed to be selected from a very specific target population, i.e. persons diagnosed with a chronic disease.

It was decided that a sample size of 75 participants would serve as target for this exploratory study. As the purpose is to make initial inquiries which will be used to inform future research, exploratory studies (in both the social and natural sciences) usually employ small sample sizes that are based on pragmatic considerations rather than the calculation of statistical power (Babbie, 2021; Beeken et al., 2017; Collett et al., 2017; Salkind, 2010; Seminowicz et al., 2019). A target sample size of 75 participants was selected using the inclusion criteria indicated above. The proposed target sample size would be sufficient with regard to performing appropriate statistical analyses, namely, cluster analysis and analysis of variance (ANOVA) (Field, 2017; Kassambara, 2017; Millsap & Maydeu-Olivares, 2009). A power analysis was also conducted. The programme G*Power (version 3.1.9.6) was used to calculate the necessary sample size needed for a one-way analisys of variance, using an alpha of 0.05, a power of 0.80, and a large effect size (odd ratio = .04) (Field, 2017). Based on these parameters, the desired

sample size was 76. Because over sampling would be employed, this sample size would be met.

3.4. Instruments

A battery of tests was used in the study, consisting of two standardised measures and a biographical questionnaire (see appendix E). Both standardised measures (the Meaning in Life Questionnaire and the Oxford Happiness Questionnaire) are freely available for use, without the consent of the developers, if used for non-commercial purposes (Hills & Argyle, 2002; Steger et al., 2006). Each of the measures are discussed below.

3.4.1 Biographical section

The biographical section of the questionnaire consisted of eight items. Age and year of diagnosis were measured at the continuous level. Gender, marital status, and employment status were measured at the nominal level and treatment frequency, level of mobility at home and level of mobility outside of home were measured at ordinal level. These items were based on findings from a previous study (Dezutter et al., 2013).

3.4.2 Meaning in Life Questionnaire

The Meaning in Life Questionnaire (MLQ) consists of ten items that are answered on a seven-point Likert scale and measures two dimensions of MIL, namely search for meaning in life (five items) and presence of meaning in life (five items). A high score on the presence of meaning in life subscale (MLQ-P) indicates an elevated subjective perception of the meaningfulness of one's life and a high score on the search for meaning in life subscale (MLQ-S) indicates an elevated drive and focus toward attaining meaning in one's life (Steger et al., 2006). The seven-point Likert scale response options range from "absolutely untrue" (indicated with a "1") to "absolutely true" (indicated with a "7") and a neutral response option ("Can't say true or false") indicated with a "4".

During the first investigation of the psychometric properties of the final version of the MLQ, Steger et al., (2006) found that the MLQ had a robust two factor structure and the MLQ-P and MLQ-S had good internal reliabilities and good test-retest (stability) reliabilities. The convergent and discriminant validities of the MLQ-P and MLQ-S subscales were established by comparing participants' scores obtained on the subscales to participants' score on other meaning in life questionnaires (the Purpose in Life Test and the Life Regard Index), wellbeing measures (the Satisfaction with Life Scale, Life Orientation Test and Rosenberg Self-Esteem Test) and informant reports.

Since it was first developed, the MLQ has become one of the most widely MIL measures, has been translated (and then validated) into several other languages (Boyraz et al., 2013; Chika Chukwuorji et al., 2019; Datu & Yuen, 2021; Singh et al., 2016) and has been proven to be a psychometrically sound measure by several independent researchers not involved in the design of the MLQ (Balgiu, 2020; Naghiyaee et al., 2020; Negri et al., 2020; Pezirkianidis et al., 2016; Schulenberg et al., 2011; Stalikas et al., 2018; Steger & Kashdan, 2007)

The MLQ has also been validated for use within the South African context. In Temane et al.'s, (2014) research the MLQ was found to have a two factor structure (construct validity) and the MLQ-P and MLQ-S had satisfactory internal reliabilities (MLQ-P, Cronbach's $\alpha = .85$; MLQ-S, Cronbach's $\alpha = .84$) when tested with a multi-cultural group of South Africa students. They further established the convergent and discriminant validity of the MLQ by comparing the scores of the MLQ-P and MLQ-S subscales to the Mental Health Continuum Short-Form, the Patient Health Questionnaire, the Satisfaction with Life Scale, the Spiritual Well-being Scale and the Sense of Coherence Scale (29 item version) (Temane et al., 2014). It is important to note that the MLQ measures the search and presence of meaning in an individual's life and not the

source(s) of meaning in an individual's life, thereby decreasing the extent to which cultural differences may impact performance.

3.4.3 The Oxford Happiness Questionnaire

The Oxford Happiness Questionnaire (OHQ) is a 29-item measure of subjective wellbeing (SWB) which utilizes a six-point Likert scale response format ranging from strongly disagree (1) to strongly agree (6). A high score on the OHQ is indicative of a higher percieved sense of SWB.

The OHQ is an improved version of the longer-established Oxford Happiness Inventory (OHI). During initial testing of the OHQ, Hills and Argyle (2002) found the measure had high scale and item reliabilities, correlated well with the OHI on an item and scale level and established the meausure's construct validity. Through extensive factor analysis they determined the OHQ was uni-dimensional (Hills & Argyle, 2002). As with the MLQ, the OHQ has since repeatedly been found to be a psychometrically sound measure (Hadinezhad & Zaree, 2009; Medvedev et al., 2017; Michalos, 2014; Robbins et al., 2010) and has been translated (and validated) into several languages (Doğan & Sapmaz, 2012; Doğan & Totan, 2013; Javad Liaghatdar et al., 2008; Mirzaee et al., 2021; Najafi et al., 2012; Rahmawati et al., 2016).

It has also been used succesfully in a Nigerian (Balogun, 2014) and two South African studies (M. Elliot et al., 2018; Mason, 2019). Mason (2019) reported that the OHQ scored an acceptable internal consistency (Cronbach's $\alpha = .71$) for a sample of South African university students. This lends support for its use in this study. Medvedev, et al., (2017) found no significant Differential Item Functioning when comparing their New Zealand (an individualistic culture) and Malaysian (a collectivist culture) participants' scores on the OHQ, which lends further support for the approriateness of its use in South Africa.

3.5. Procedure

A pilot study was conducted before the commencement of the study to ascertain whether there were any problems with the questionnaire. Ten individuals partook in the pilot study. The pilot study followed the same procedure and was conducted in the same context (Tygerberg Hospital, same inclusion criteria, etc.) as the main study, except that after completion of the questionnaire participants were asked for verbal feedback regarding their experience of completing the questionnaire (including questions regarding the clarity of the instructions and difficulty with any items). Based on the feedback from the participants, observations made and analysis of the data collected, minor changes were made to the questionnaire. The data collected from the pilot study were not used in the main study.

The questionnaire was administered in paper-and-pencil format to eliminate bias that could be introduced by using computer-based assessment (due to computer literacy differences). Participants were recruited from patients awaiting treatment at the hospital. A broad explanation of the study was given to potential participants and they were asked if they were interested in participating. Those who wished to participate, had been diagnosed with a chronic disease (they were not asked to specify which disease(s) they had been diagnosed with) and met the other inclusionary criteria were given a clipboard with the information sheet, consent form and questionnaire, a pencil and eraser. The study and information sheet were then explained in full and given the opportunity to ask questions and those that wished to partake were asked to sign the consent forms. The questionnaire and how to complete the different sections were explained, participants were given an opportunity to ask questions and then given privacy to complete the questionnaire.

To minimise possible exposure to SARS-CoV-2, participants were given hand sanitiser

before and after the completion of the questionnaire and clipboards, pencils and erasers were sanitised before every use.

Participants' responses were captured on IBM SPSS Statistics version 27 (SPSS-27) using a codebook that was developed prior to starting the data collection and all responses were rechecked to ensure the accuracy of the data captured.

3.6. Data analysis

Unless stated otherwise, data processing and analysis was conduct using SPSS-27. Below (figure 1) is a graphical representation of the analysis process that was followed for the main study. In addition, table one provides an overview of the analysis techniques used to achieve each of the stated objectives that were used to guide the study and to achieve the overarching aim.

Figure 1

Data Analysis Procedure

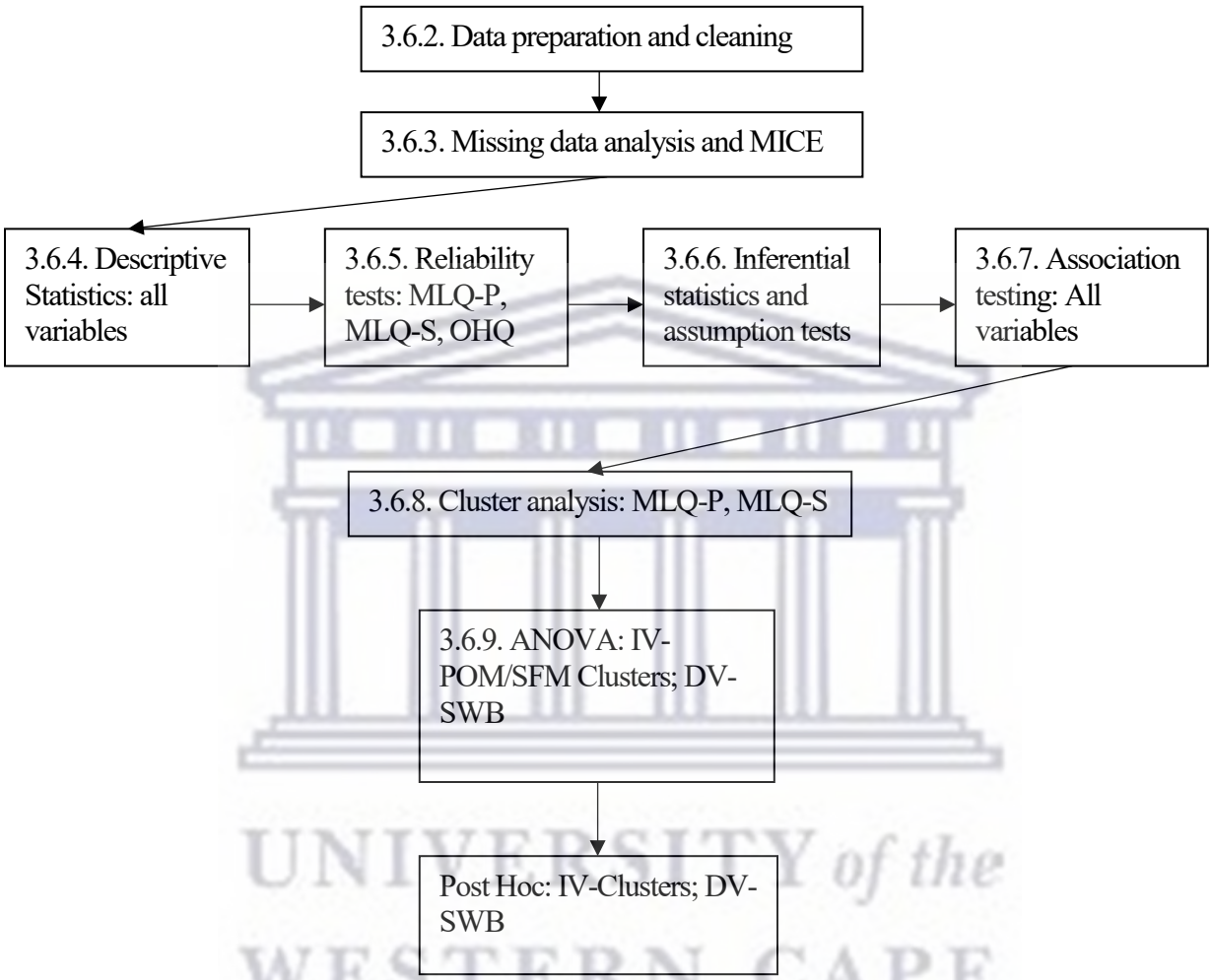


Table 1

Analysis techniques used to achieve research objectives

Sub-heading	Statistical analysis	Research objective
3.6.7. Tests of association	Kendall's tau	Determeine associations between POM, SFM and demographic variables: age, home mobility, outside home mobility, treatment frequency, illness duration
	Kruskal-Wallis test	Determeine associations between POM, SFM and demographic variables: gender, marital status, employment status
3.6.9. Analysis of variance	Analysis of variance, Tukey-Cramer Post-hoc test	Determine association between POM and SFM and wellbeing

3.6.1. Pilot

Each completed questionnaire was individually scrutinised to identify any repetitive response irregularities, specifically impossible answers (for example a score of eight on a 7-point Likert scale) consistent extreme or central/neutral responses and non-response. The data captured on SPSS-27 was used to investigate item totals and case totals for possible irregularities. The verbal feedback from participants as well as observations made during the assessment process (e.g. items and scales several participants had difficulty understanding) were considered.

3.6.2. Data Preparation

All data preparation was done using SPSS-27.

- Item 1.4. (year of diagnosis) was transformed to indicate the number of years the participant had been ill with their chronic disease (illness duration) by subtracting their year of diagnosis from 2021.
- Item 9 of the MLQ is reversed scored and, therefore, this variable (V2_9) was reverse-coded to reflect this.

- Items 1, 5, 6, 10, 13, 14, 19, 23, 24, 27, 28 and 29 of the OHQ are reversed scored and, therefore, these variables were reverse-coded.

Frequency statistics were run to examine minimum and maximum values for unattainable totals and to determine the extent of the missing data.

3.6.3. Missing data

A count of the missing values per case was created and frequency statistics were run again. The number and percentage of missing data for each case and each variable was examined individually and four cases were excluded from the dataset either due to a high overall percentage of missing values and/or a high percentage of missing values for a specific section. After deletion of these four cases the extent of the missing data per case was low enough (<10%) to be able to use an imputation technique without introducing bias (Hair et al., 2019). The variable "illness duration" had a missing values percentage of 16%, but it was not excluded as imputation techniques were only used for MLQ and OHQ variables. The extent of missing data for the remainder of the variables were sufficiently low and the percentage of missing data across the entire dataset was only 1.6%.

A missing values analysis was conducted on the new dataset (81 cases) to determine the level of randomness of the missing data. Little's Missing Completely at Random (MCAR) test returned a non-significant result ($X^2(461, N=81) = 479.437$, $p = .267$) indicating the missing data is MCAR. As the percentage of missing data is less than 10% and data is MCAR, any imputation or model-based remedy can be used (Hair et al., 2019; Tabachnick & Fidell, 2019).

Multivariate imputation by chained equations (MICE), a type of multiple imputation (MI) model-based method, was selected to address the missing MLQ and OHQ variables' data. In MI procedures a specified number (*m)* of complete datasets are generated, these datasets are

analysed and then pooled to create a final, complete dataset. An MI procedure was selected as it can be used with metric and non-metric data, can be used with several statistical techniques (Hair et al., 2019; van Buuren, 2018) and has been found to provide less biased estimates (Huque et al., 2018). MICE follows a sequential process in which missing data is calculated on a variable-by-variable, value-by-value basis using the full dataset, including the new imputed data and repeated based on the number of iterations selected. This process is then repeated for each subsequent dataset using the data from the previously new imputed dataset (Tabachnick & Fidell, 2019). Two of the main advantages to MICE is that the uncertainty of the accuracy of imputation predictions is taken into account and the standard errors are more accurate (Azur et al., 2011). MICE was run using 10 iterations per imputed dataset and a total of five datasets were created as recommended in the literature (van Buuren, 2018). The five datasets were pooled using the mode of each value (Tabachnick & Fidell, 2019).

The pooled dataset of the MLQ and OHQ items were merged with the data from the variables for which imputation was not used. The MLQ-S, MLQ-P and OHQ items were summed to create three new variables; search for meaning in life (SFM), presence of meaning in life (POM) and subjective wellbeing (SWB), respectively. This created the final dataset.

Missing data was also identified for the Illness duration, Home mobility, Outside home mobility, Treatment frequency and Employment status variables. The missing data for these variables were addressed using pairwise deletion. In pairwise deletion cases are excluded on a test-by-test basis (Field, 2017; Hair et al., 2019).

3.6.4. Descriptive statistics

Descriptive statistics were used to create a summary profile of the sample's demographic information (Gravetter et al., 2020). The mean and standard deviation was calculated for scale

variables and count and percentage was calculated for categorical variables.

3.6.5. Measurement of reliability

Cronbach's alpha analyses were conducted to assess the internal reliability of the MLQ's two subscales (MLQ-S and MLQ-P) and the OHQ.

MLQ-P. The MLQ-P consisted of 5 items and yielded a Cronbach α of .79 (see table 2), indicating that the subscale had a high internal reliability. All item-total correlations (see table 3) were above .3 which is a further indication of the subscale's reliability (Field, 2017). The deletion of one of the items ("I understand my life's meaning") would have increased the subscale's Cronbach α to .82. However, the item had a satisfactory item-total correlation (r = .33), the increase to the alpha's value would have been minimal, the removal of the item would have left the subscale with only four items and the MLQ-P subscale would then have less items than the MLQ-S subscale and, therefore, the item was retained.

Table 2

Reliability Statistics for Presence of Meaning in Life Subscale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.789	.796	5

Table 3

Item-Total Statistics for Presence of Meaning in Life Subscale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I understand my life's meaning	21.01	29.862	.330	.815

My life has a clear sense of purpose	21.30	24.436	.693	.711
I have a good sense of what makes my life meaningful	21.00	24.525	.746	.699
I have discovered a satisfying life purpose	21.68	23.471	.608	.735
My life has no clear purpose	21.68	23.196	.523	.773

MLQ-S. The MLQ-S consisted of 5 items and yielded a Cronbach α of .89 (see table 4), indicating the subscale had a high internal reliability. All items correlated well with the total score (correlations varied between .62 and .83; see table 5) which is a further indication of the subscale's reliability. Deleting any of the items would not have increased the Cronbach α.

Table 4

Reliability Statistics for Search for Meaning in Life Subscale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.889	.889	5

Table 5

Item-Total Statistics for Search for Meaning in Life Subscale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I am looking for something that makes my life feel meaningful	20.04	47.386	.687	.875
I am always looking to find my life's purpose	19.85	45.428	.790	.851

I am always searching for something that makes my life feel significant	19.74	49.869	.627	.888
I am seeking a purpose or mission for my life	20.00	44.700	.838	.841
I am searching for meaning in my life	20.37	45.861	.717	.869

Oxford Happiness Questionnaire. The initial analysis returned a high Cronbach α of .87 (see table 6) for the scale's overall internal reliability, however at the item level several problems were identified. The item-total statistics indicated that deleting items 2, 4, 5, 7, 14, and 19 would increase the scale's internal reliability and items 2, 4, 5, 7, 13, 14, 17, 19 and 20 did not correlate well with the total scale ($r < .3$). These items were inspected by first determining if they were all reversed-scored items and then if they covered a specific theme. Five of the items that did not contribute to the scale's Cronbach α and/or correlated poorly with the overall scale were reversed-scored items, however the remaining seven reversed-scored items performed well. The problematic items also did not focus on a specific theme.

The six items that negatively affected the scale's internal reliability were excluded and a Cronbach α test was conducted on the remaining 23 items. The Cronbach α increased to .89 and item 17 now had an acceptable correlation with the total scale ($r = .31$). Items 13 and 23 still correlated poorly with the scale total ($r = .27$ and $r = .29$ respectively) and 13 also negatively impacted the Cronbach α, therefore, items 13 and 23 were excluded from the scale and a Cronbach α test was conducted on the remaining 21 items. The Cronbach α increased, but item 29 now negatively impacted the Cronbach α and was also excluded from the scale. The Cronbach α test was conducted on the remaining 20 items and items 1 and 10 were identified as negatively impacting the scale's Cronbach α and were subsequently excluded from the scale. The

next Cronbach α test indicated that item 6 had a negative impact on the scale's internal reliability and was then also excluded. The final Cronbach α test indicated that the remaining 17 items all correlated well with the total scale ($r > .3$) and positively contributed to the scales Cronbach α (α = .9). It was, however, decided to retain all OHQ items as removing items may have an impact on the integrity of the scale (Field, 2017).

Table 6

Reliability Statistics for the Oxford Happiness Questionnaire

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.871	.878	29

3.6.6. Inferential statistics and assumption testing

Inferential statistics were used to create a typology of POM and SFM data and to determine the associations between the different variables. As the analysis required the use of several statistical techniques, several data assumptions were also tested.

3.6.7. Tests of association

Several statistical analyses were conducted as an initial investigation of the associations between the three primary variables (POM, SFM and SWB) and the demographic variables. The use of different tests of association were required due to different levels of measurement and data assumption violations.

Scale level variables. POM, SFM, SWB, age and illness duration data were analysed to determine which type of correlation would be most appropriate based on which data assumptions were met. The assumption of the absence of outliers was tested by creating a boxplot for each variable. No outliers were detected for POM, SFM and SWB, however, age and illness duration

each had one outlier. The Shapiro-Wilk test, which is the recommended test for small samples (Verma & Abdel-Salam, 2019), was conducted as well as the skewness and kurtosis of the variables to test the assumption of normal distribution (see table 7).

Table 7

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Age	.054	81	.200*	.985	81	.479
Illness Duration	.155	68	<,001	.853	68	<,001
Presence of Meaning in Life	.118	81	.008	.947	81	.002
Search for Meaning in Life	.165	81	<,001	.882	81	<,001
Subjective Wellbeing	.085	81	.200*	.979	81	.194

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Based on the results of the Shapiro-Wilk's test [$W(81) = .99$, $p = .479$], age data were determined to be normally distributed. This finding was further supported with a skewness of .11 ($SE = .27$) and kurtosis of -.41 ($SE = .53$). Illness duration data, however, was significantly non-normal based on the Shapiro-Wilk's test, $W(68) = .85$, $p < .001$, a skewness of 1.64 ($SE = .29$) and kurtosis of 4.57 ($SE = .57$) (Field, 2017; Pallant, 2020).

POM was significantly non-normal based on the Shapiro-Wilk's test, $W(81) = .95$, $p = .002$, but would be interpreted as normal based on a skewness of -.3 ($SE = .27$) and kurtosis of .96 ($SE = .53$). SFM scores also produced conflicting results with a significant Shapiro-Wilk's test [$W(81) = .88$, $p < .001$] indicating a non-normal distribution, but the skewness of -1.01 ($SE = .27$) and kurtosis of .13 ($SE = .53$) indicating that the data is normally distributed. The SWB

scores were determined to be normally distributed by the Shapiro-Wilk's test, $W(81) = .98$, $p = .194$, skewness, -.42 ($SE = .27$) and kurtosis, -.12 ($SE = .53$) (Field, 2017; Pallant, 2020).

Pearson's *r* (Pearson product-moment correlation), Spearman's rho (Spearman rank-order correlation) and Kendall's tau (Kendall rank correlation coefficient) all measure the strength of the association between variables. However, Pearson's *r* is a parametric test and requires data to meet the assumptions of linearity, normality, no-outliers and requires scale level data. Spearman's rho and Kendall's tau, conversely, are non-parametric tests. They are more robust than Pearson's *r* and can be used when normality and no-outlier data assumptions are violated and can be used with both scale and ordinal level data (Field, 2017; Tredoux & Durrheim, 2018). Kendall's tau is preferred over Spearman's rho when working with small datasets and/or datasets containing a large number of tied ranks (Field, 2017). Due to the outliers identified in the age and illness duration data, the non-normal distribution of the illness duration data and the small sample size it was decided to assess their association to the primary variables using Kendall's tau. As there were conflicting results regarding the normality of POM and SFM, both Pearson's *r* and Kendall's tau were conducted to test the associations between POM, SFM and SWB.

Ordinal level variables. Kendall's tau was used to assess the home mobility, outside home mobility and treatment frequency variables' associations to the primary variables due to level of measurement and the sample size.

Nominal level variables. Gender, marital status and employment status were measured at the nominal level and, therefore, the use of a correlation test would be inappropriate (and non-sensical). Instead the gender, marital status and employment status variables' association with the primary variables were assessed using the Kruskal-Wallis test. The Kruskal-Wallis test is a nonparametric version of the ANOVA. As with the ANOVA, it is used to compare the

differences between three or more independent groups, however, the Kruskal-Wallis test does not require data to meet the assumption of normal distribution. Data must, however, meet the following assumptions: the dependent variable(s) must be measured at the continuous or ordinal level, the independent variables must be measured at the nominal level and consist of two or more independent groups and independence of observations (Field, 2017; Kolassa, 2021). The dependent variables (POM, SFM and SWB) were measured at the continuous level, the independent variables (gender, marital status and employment status) were measured at the nominal level and each consisted of two or more groups and observations were independent. Therefore, gender, marital status and employment status data met all data assumptions for the Kruskal-Wallis test.

3.6.8. Cluster analysis

The POM and SFM data were exported to RStudio Version 1.4.1103 for the cluster analysis. Cluster analysis is an unsupervised machine learning multivariate statistical technique which groups cases into clusters so that the cases in each cluster are more similar to each other than the cases in other clusters (Hair et al., 2019; Kassambara, 2017). Cluster analysis, or clustering, attempts to discover naturally occurring patterns within a dataset (Hair et al., 2019; Kassambara, 2017). Cluster analysis was applied to the POM and SFM data in an attempt to identify consequential POM and SFM profiles.

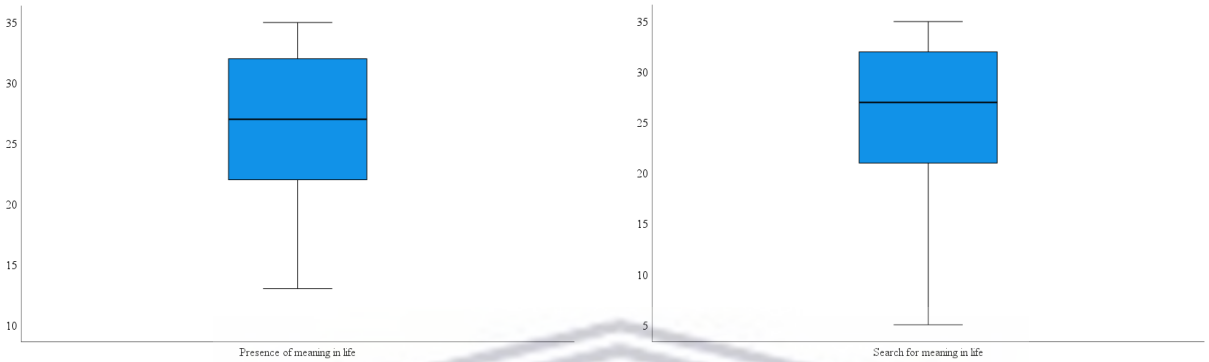
Data assumptions. The first data assumption refers to the existence of a structure within the data (Hair et al., 2019). One of the dangers of clustering is that it will produce clusters even if no meaningful clusters (structure) exist. This danger can be addressed by assessing cluster tendency, the feasibility and appropriateness of conducting a cluster analysis. This is done in three ways. Firstly, from a theoretical stance, the variables used must be related. POM and SFM

are related (as was discussed in chapter 2). Second, the clusterability of the data is assessed. This was done using the Hopkins statistic. The Hopkins statistic assesses the probability that the data is uniformly distributed, i.e. it tests the spatial randomness of the data to determine if the data contains meaningful clusters (Kassambara, 2017). Z-scores were used to standardise the POM and SFM data and a seed (starting point) of 123 was set for use by the pseudo-random number generator to ensure reproducibility of the analysis. The Hopkins statistic was conducted and returned a result of H = .6. This is above the threshold of .5 which indicates the POM and SFM dataset is clusterable (Kassambara, 2017). Lastly, the optimal number of clusters is determined as part of the cluster validation process. Cluster validation can refer to the clustering method (e.g. hierarchical, k-means, k-medoids, fuzzy) and the clustering result (Ullmann et al., 2021). This is a difficult task as no single stopping rule or statistical technique exists (Ullmann et al., 2021). Determining the optimal cluster solution was determined by an ongoing process, including pre-analysis tests (e.g. the elbow method) as well as conducting several cluster analyses using different cluster solutions and investigating and comparing the different statistical and graphical outputs. This is reported on later in this chapter.

Cluster analysis requires the absence of outliers as outliers may distort the results (Hair et al., 2019). An investigation of the boxplots for POM and SFM revealed that neither variable included outliers (see Figure 2).

Figure 2

POM and SFM Boxplots



It is also assumed that the sample is representative of the population, however this data assumption did not apply to the study as the results of the study were not used to make generalisations. The last data assumption is in regards to the multicollinearity of the variables used. In clustering, multicollinearity causes variable weighting (Hair et al., 2019). For example, if four of the variables used in a cluster analysis are highly correlated, thereby measuring the same underlying construct, this construct will have four times the weight of the other variables. As the current study only used two variables, variable weighting and, therefore, multicollinearity was not a concern (Hair et al., 2019).

Cluster analysis technique. First the data was standardized using z-scores. It is recommended that when the clustering variables are not measured on the same scale that the data should be standardized (Hair et al., 2019; Kassambara, 2017). It is also recommended that the data should be standardized if there are substantial differences between the clustering variables' standard deviations (SD) as a variable with a larger SD will have a greater impact on the final similarity result (Hair et al., 2019). Although POM and SFM are measured on the same scale, there is a 34.69% difference in their SD's and, therefore, it was decided that standardization was necessary.

Clustering techniques can be divided into two main categories, namely partitional clustering (e.g. k-means and k-medoids) and hierarchical clustering. A hybrid clustering technique which combines hierarchical clustering (using Ward's method) and k-means (using Hartigan-Wong's algorithm) clustering was employed. In Ward's agglomerative hierarchical clustering, each individual case is initially treated as a cluster of its own. The clusters are then successively merged based on their similarity until all cases are merged to form a single cluster. Ward's method determines similarity based on by how much the sum of squares within a cluster will increase when merging it with another cluster. The cluster merging that will increase the within-cluster sum of squares, the least is then merged. A lower within-cluster sum of squares denotes lower variance within the cluster, i.e. greater within-cluster homogeneity. The result of this method produces a dendrogram (Hair et al., 2019; Kassambara, 2017). Squared Euclidian distance was selected as the distance measure.

K-means clustering is an iterative process in which the number of clusters (*k)* is prespecified by the user. In the Hartigan-Wong k-means algorithm, *k* initial centroids (the mean of all the cases in a cluster) are randomly selected and each case is then assigned to a cluster based on the nearest centroid. The centroids are then moved to the mean of all the cases in their respective clusters. All cases are then reassigned to the nearest centroid and the centroids are then moved to the new cluster means. This process continues until convergence (the centroids stop moving) occurs (Hair et al., 2019; Hartigan & Wong, 1979). As with Ward's method, the Hartigan-Wong algorithm does not directly measure distance, instead it uses the within-cluster sum of squared Euclidian distances (Hartigan & Wong, 1979; Kassambara, 2017).

The main limitation of hierarchical clustering is that once a case has been assigned to a cluster, it cannot be reassigned to a different cluster. In k-means clustering, the main limitation

lies with the inability of replicating the results as the clustering outcomes will be slightly different each time the analysis is conducted because the initial centroids are selected at random (Hair et al., 2019). By using the hybrid hierarchical, k-means (HK) clustering method these limitations were eliminated.

During the first phase of the cluster analysis, Ward's hierarchical clustering was used to analyse the data and produce a dendrogram. The dendrogram was then cut into two clusters and the centroids for the two clusters were calculated. The centroids for the two-cluster solution was then fed into the Hartigan-Wong k-means algorithm so that the algorithm would use it as the two initial centroids. This process was repeated for $k = 3$ to $k = 10$ to allow for comparison during validation of the cluster solutions.

Selecting number of clusters and cluster validation. Cluster validation is used to assess the quality of the clustering (Kassambara, 2017). However, the quality is predominantly based on the number of clusters selected, therefore, it was decided to conduct the validation in conjunction with determining the optimal number of clusters, by comparing the properties and results of validity indexes on different cluster solutions to determine the optimal number of clusters and validate the selected cluster solution simultaneously. The HK cluster analysis method was conducted nine times with k values ranging from two to ten clusters. During each step of the validation process, cluster solutions that did not meet the different criteria were eliminated.

Several statistical methods exist to determine the optimal number of clusters and to analyse the quality of the cluster solution. Hennig et al. (2015) explained that the optimal number of clusters was dependent on the context and aim of the cluster analysis. Several studies have demonstrated that the accuracy of validity indexes differ from context to context and that no single validity index is suited for all circumstances (e.g. Hämäläinen et al., 2017; Kumar & Raju,

2018; Vergara et al., 2020). Akhanli and Hennig (2020) explain that “the data cannot decide about the “optimal” clustering on their own, and user input is needed in any case” (p. 1524). Determining the optimal number of clusters requires a combination of researcher knowledge and judgement and an aggregate of cluster validity techniques.

Cluster validation can be assessed based on external validity, internal validity, stability analysis, hypothesis testing and/or visual validation. External validation can only be assessed if additional data, beyond that which is used in the clustering, is available (Ullmann et al., 2021), e.g. a study that attempts to cluster protein expressions from cancerous and non-cancerous tissue would have additional data as to which cases should be in the cancerous and non-cancerous clusters and that a two-cluster solution should be used. The current study does not utilise such additional information and the aim of the clustering is to investigate and identify novel groupings.

Internal validation indexes use only the cluster data to assess the quality of the clustering. These indexes compare different clusterings by measuring properties such as within-cluster homogeneity and between-cluster heterogeneity (Ullmann et al., 2021). The first factor that was considered was total variance. Total variance refers to the percentage of the total variance in a dataset that is explained by the clustering (Hair et al., 2019; Ullmann et al., 2021). The total variance was calculated by dividing the total between-cluster sum of squares by the total sum of squares of the dataset and multiplied by 100 to convert it to a percentage. Cluster solutions that did not have a high enough total variance were excluded from the remainder of the validation process.

The total within-cluster sum of squares indicates the sum of the variance in each cluster in the cluster solution. A lower score indicates higher homogeneity within the clusters which

indicates a better fit. As the number of clusters in a cluster solution increases the total within-cluster sum of squares will decrease. Based on the change of the total within-cluster sum of squares from one cluster solution to the next, cluster solutions that did not markedly decrease the total within-cluster sum of squares were eliminated.

Next six validity indexes were applied to the remaining cluster solutions. The clusterCrit R package was used to conduct the first five indexes. The Calinski–Harabasz index uses the ratio of the sum of the between-cluster variance and the total within-cluster variance to determine the quality of the clustering. A higher score indicates higher within-cluster homogeneity (Scitovski et al., 2021). The Trace WiB index/criterion is calculated by dividing the between-group variance by the within-group variance. This is done by using both the dataset centroid and each individual cluster's centroid (Friedman & Rubin, 1967; Nagargoje et al., 2021). The Average Silhouette Width (ASW) assesses how well each case fits in its cluster. A higher ASW indicates a better clustering (Kassambara, 2017). The Dun index is the ratio of the shortest between-cluster distance to the longest within-cluster distance. The higher the Dun index, the better the quality of the partitioning (Scitovski et al., 2021).

S_Dbw Index also establishes the quality of the clustering using the within-cluster variation and between-cluster variation, but determines the within-cluster variation using the SD's of the cases in a cluster and establishes the between-cluster variation using the density estimation at the center of two centroids. A smaller S_Dbw, is indicative of a better clustering (S. Liang et al., 2020). A very commonly used method in establishing the optimal number of clusters is the Elbow method (Shi et al., 2021). The Elbow method is a graph that plots the total within-cluster sum of squares as a function of the number of clusters (Thorndike, 1953). The optimal number of clusters is then selected based on the "elbow" of the graph. The elbow

indicates the point at which adding another cluster would not substantially improve the total within-cluster sum of squares (Shi et al., 2021; Wierzchoń & Kłopotek, 2018). The Elbow method was conducted using the NbClust R package. An advantage of this package is that it automatically indicates the elbow of the graph with a dashed line.

Based on the above analyses a cluster solution was selected. The results of the selected HK clustering included the cluster membership of each case, that is, the cluster to which each case was assigned to. The cluster membership numbers were then added to the original POM and SFM dataset and exported to SPSS.

Labeling the clusters. The last step in the clustering process was to label (name) the clusters. This is done by examining each cluster and identifying a label that best describes the characteristics of each cluster (Hair et al., 2019). This was done by calculating the centroid of each cluster and comparing it to the POM and SFM quartiles. Labeling of the clusters were also used as a final validation technique. Cluster analysis is used to group similar cases to enable the identification of distinct, meaningful profiles (Hair et al., 2019). Therefore, if the cluster solution is valid, the technique used to label the clusters would produce clusters with different labels.

The centroids could not be directly compared to the quartiles whilst in standardized form, therefore, using RStudio, the POM and SFM data used for the cluster analysis were reverted to raw scores and the centroid of each cluster was calculated. Frequency statistics were then run on the POM and SFM data from the original dataset using SPSS to calculate the quartiles. The clusters' centroids were then compared to the POM and SFM quartiles and used to interpret and label the clusters.

3.6.9. Analysis of variance

Analysis of variance (ANOVA) was used to investigate the relationship between the

POM/SFM clusters (independent variable) and SWB (dependent variable). ANOVA is an extension of the t-test (Field, 2017; Pallant, 2020). As with t-tests, ANOVA is used to compare means across groups, but unlike a t-test, an ANOVA can be used to compare means across more than two groups. Conducting multiple sequential t-tests increase the risk of committing a Type I error (i.e. rejecting the null hypothesis when it is true). An ANOVA allows for the comparison of several groups simultaneously using a single formulae and, therefore, limits the risk of committing a Type I error. (Field, 2017; Pallant, 2020). As the dependent variable (POM/SFM clusters) consists of four groups and the groups are independent of one another (i.e. it is not a repeated measures design) a one-way independent ANOVA was selected (Pallant, 2020).

Data assumptions. A data set must meet six assumptions to allow for the use of a one-way independent ANOVA. First, the dependent variable must be measured at continuous level. SWB was measured at continuous level and, therefore, this assumption was met. Second, the independent variable must consist of two or more categorical, independent groups. The POM/SFM clusters consist of four independent groups, therefore, the second assumption was met. The third assumption refers to independence of observations. The data met this assumption as each cluster consisted of different people (i.e. a case could only belong to one group) and research participants were dealt with on a one-on-one basis, thereby minimising the possibility of participants influencing each other's answers.

The forth assumption is normal distribution and the fifth is absence of significant outliers. This was assessed earlier (see 3.6.7. Tests of association) and SWB met both of these assumptions. The last data assumption, homogeneity of variance was tested using Levene's test. The Levene's test (see table 8) for SWB [$F(3, 77) = 1.625$, $p = .19$] was non-significant, indicating the homogeneity of variance assumption was satisfied (the test statistic for the

medians was used as it is more robust than the mean (Field, 2017)).

Table 8

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Subjective wellbeing	Based on Mean	1.731	3	77	.168
	Based on Median	1.625	3	77	.190
	Based on Median and with adjusted df	1.625	3	69.049	.192
	Based on trimmed mean	1.734	3	77	.167

Post-hoc analysis. A limitation of ANOVA's is that it does not indicate between which groups the difference lies, merely that a difference exists (Field, 2017; Tredoux & Durrheim, 2002), therefore, a significant ANOVA must be followed up with planned contrasts or post hoc tests to identify the source of the difference. For this study, the ANOVA was followed up with a post-hoc analyses to determine the source(s) of the significant results. The Tukey–Kramer procedure was used for the post-hoc analysis as it makes all pairwise comparisons, controls for Type I errors, is statistically powerful and can be used with unequal group sizes (Frey, 2018).

3.7. Ethics

Permission to conduct this study was obtained from the Biomedical Research Ethics Committee (BMREC) of the University of the Western Cape (see appendix A). Permission to conduct the study at Tygerberg Hospital was obtained from the Western Cape Department of Health and Tygerberg Hospital (see appendix B).

3.7.1. Beneficence

The research expanded current knowledge of the relationship between POM, SFM and SWB, which may aid in the creation of therapeutic/intervention programmes for persons with chronic diseases. Dissemination of the results may also call attention to the struggles experienced

by persons suffering from chronic diseases and the need to include psychological treatment as part of the chronic disease treatment plan.

Individual MLQ and OHQ results (including a short explanation of the results) were shared with participants who indicated they wanted to receive feedback. Sixty-one participants received feedback.

3.7.2. Nonmaleficence

The constructs measured and the topic under investigation could all have elicited negative affective responses. To negate this, a list of counselling services was included in the information sheet. The researcher's contact details were also included if further referral was needed.

As the data collection occurred during the Covid-19 pandemic, certain precaution measures (wearing of masks by all, regular use of hand sanitiser, and sanitising of clipboards, pencils and erasers after each use) were put in place to minimise the risk of infection.

3.7.3. Confidentiality and privacy

The demographic section, MLQ and OHQ were compiled into a single document (see appendix E). A unique code (which appeared on each page) was assigned to each questionnaire. This allowed for statistical comparisons without including participants' personal identifying information on the completed measures. The names and e-mail addresses / WhatsApp numbers of participants who wanted to receive feedback regarding their individual results were collected on a separate page along with their unique code to enable the researcher to give feedback on their individual results. The data from this sheet was captured onto a password protected laptop and the original document was destroyed. Once feedback was sent to participants, the document was deleted.

The completed questionnaires and consent forms are still securely stored and will be kept

for five years (as required by UWC policy and The Protection of Personal Information Act 4 of 2013) and then destroyed.

3.7.4. Informed consent

Potential participants were given an information sheet (see appendix D) and sufficient time to read through it. They were then given an opportunity to ask questions. The information sheet explained the nature, aims and purpose of the study, what their rights (including that participation is voluntary and that they can withdraw at any time) as participants are and what will be required of them if they choose to participate. The information sheet also included the contact information of the researcher, her supervisor and the BMREC.

A consent form was given to those that wanted to participate. After they read through the consent form, they were asked to sign the form and return it to the researcher, if they wanted to partake.

3.8. Chapter summary

This chapter outlined and explained the methodological basis for the study. The cross-sectional, exploratory study used a questionnaire (consisting of a demographic section and two standardised tests) to collect data on the POM, SFM and SWB of patients with chronic diseases at Tygerberg Hospital. Before the commencement of the main study, a pilot study was conduct and the findings from this was used to make changes to the questionnaire.

The data collected during the main study was first cleaned and prepared for analysis and MICE was used to impute values for missing data for items from the MLQ and OHQ questionnaires. Several data assumptions were tested to enable the selection of the appropriate statistical analyses and each of the analysis techniques were discussed. The chapter ended with a discussion on the ethical principles that were applied to the study.

Chapter four: Results

This chapter offers the results and an explanation of the results of the analyses that were described in the previous chapter. It follows the same sequence as was laid out in the data analysis procedure in figure 1.

4.1. Pilot study

Consistent extreme and central/neutral response sets were not identified. Except for one case, patterns of non-response were also not identified and no impossible answers or totals were found. Therefore, at a quantitative level, no problems were identified.

Several participants had difficulty answering items 1.5 ("Are you able to move about your home without assistance from a person and/or apparatus (e.g. wheelchair, crutches, etc.)?") and 1.6 ("Are you able to function outside of your home without assistance from a person and/or apparatus (e.g. wheelchair, crutches, etc.)?") due to the dichotomous response options available ("yes" and "no"). Some of the participants explained that their level of mobility was not constant. The response options for these two items were, therefore, changed to "Yes, always", "Yes, sometimes" and "No, never". Item 1.7. ("How frequently do you receive medical/physical treatment?") was misinterpreted by some participants as including taking medication. The item was rephrased to "How frequently do you receive medical/physical treatment from a doctor, nurse or other medical health professional?" to increase the specificity of the item.

During the assessment it was observed that some participants had difficulty understanding the response format of the MLQ and OHQ. To aid in explaining this, a response example was added.

4.2. Descriptive statistics

The descriptive statistics are summarised in table 9. The participants' ages ranged from 18 to 80 years old with an average age of 46 (*SD* = 14.36). The majority of participants were female (71.6%) and nearly half were married (43.2%). Most participants could function/move completely independently within (59.2%) and outside (61.8%) their homes. The vast majority of participants (70.3%, *n* = 74) received medical treatment from a health care professional less than once a month. Only a quarter of participants were employed (25.3%) and close to half of participants were unemployed (48%). Illness duration varied between 1 and 40 years with the average duration being 8.26 years (*SD* = 7.14).

Table 9

Demographic statistics of research sample

	N	Percentage	Minimum	Maximum
Age (in years)	81	*M* = 46.06 (*SD* = 14.359)	18	80
Gender	81			
Female	58	71.6		
Male	23	28.4		
Marital Status	81			
Never married	27	33.3		
Married	35	43.2		
Divorced/separated	9	11.1		
Widowed	7	8.6		
Other	3	3.7		
Home mobility (Are you able to move about your home without assistance from a person and/or apparatus)	76			
Always	45	59.2		
Sometimes	24	31.6		
Never	7	9.2		

	N	Percentage	Minimum	Maximum
Outside home mobility (Are you able to function outside of your home without assistance from a person and/or apparatus)	76			
Always	47	61.8		
Sometimes	22	28.9		
Never	7	9.2		
Treatment frequency	74			
Daily	3	4.1		
Several times a week	1	1.4		
Several times a month	18	24.3		
Less than once a month	52	70.3		
Employment status	75			
Employed	19	25.3		
Unemployed	36	48.0		
Retired	12	16.0		
Disabled	3	4.0		
Volunteer	1	1.3		
Student	2	2.7		
Other	2	2.7		
Illness duration (in years)	68	*M* = 8.26 (*SD* = 7.142)	1	40

4.3. Initial tests of association

4.3.1. Correlation analysis

Based on the Pearson product correlation (see table 10), there was a significant relationship between a participant's level of POM and their level of SFM, $r = -.25$, $p = .023$. This relationship was negative (i.e. as the one variable increases the other variable decreases) and had a medium effect, explaining 6.4% of the total variance. A person's level of POM was also significantly associated with their level of SWB, $r = .67$, $p < .001$ and had a large effect,

explaining 45.3% of the total variance. SFM was not significantly correlated to SWB, $r = -.1$, $p = .386$, with a small effect, explaining less than 1% of the total variance.

Table 10

Pearson Product Correlation for Primary Variables

	n	*M*	*SD*	1	2	3
1. Presence of meaning in life	81	26.667	6.103	-		
2. Search for meaning in life	81	25	8.422	-.253* [-.448, -.015]	-	
3. Subjective wellbeing	81	119.704	22.254	.673** [.563, .772]	-.098 [-.290, .110]	-

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

BCa bootstrap 95% CI's reported in brackets

Results of Kendall's tau (see table 11) also indicated that POM was significantly related to SWB, $\tau = .51$, $p < .000$. However, it did not find a significant relationship between POM and SFM ($\tau = -.081$, $p = .306$,) or between SFM and SWB ($\tau = -.013$, $p = .864$).

Table 11

Kendall Rank Correlations for Scale and Ordinal Level Variables

	N	*M*	*SD*	1	2	3
1. Presence of meaning in life	81	26.667	6.103	-		
2. Search for meaning in life	81	25	8.422	-.081 [-.246, .090]	-	
3. Subjective wellbeing	81	119.704	22.254	.507** [.385, .619]	-.013 [-.160, .122]	-
4. Age	81	46.06	14.359	.092 [-.068, .242]	-.222** [-.363, -.075]	.120 [-.030, .273]
5. Home mobility	76	-	-	-.223* [-.405, -.038]	-.096 [-.297, .108]	-.199* [-.372, -.038]
6. Outside home mobility	76	-	-	-.162 [-.346, .039]	-.089 [-.262, .078]	-.140 [-.315, .062]
7. Treatment Frequency	74	-	-	-.133 [-.306, .053]	-.200* [-.357, -.026]	-.044 [-.229, .137]
8. Illness Duration	68	8.26	7.142	-.082 [-.261, .093]	-.077 [-.293, .150]	-.118 [-.299, .062]

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

BCa bootstrap 95% CI's reported in brackets

Age was not significantly related to POM (τ = .092, *p* = .239) or SWB (τ = .120, *p* = .118), but was significantly associated with SFM (τ = -.222, *p* = .004). Home mobility was significantly related to POM (τ = -.223, *p* = .018) and SWB (τ = -.199, *p* = .031) but not SFM τ =

-.096, p = .309). There was not a significant association between the frequency with which participants received treatment and their level of POM (τ = -.133, p = .168) or their level of SWB (τ = -.044, p = .643). There was, however, a significant association between the frequency with which participants received treatment and their level of SFM (τ = -.200, p = .038). Outside home mobility and illness duration did not have significant associations with any of the primary variables.

4.3.2. Kruskal-Wallis one-way analysis of variance

The first Kruskal-Wallis test was conducted to examine the differences of POM, SFM and SWB to gender. The results revealed there were no significant differences across gender categories for POM [H(1) = 1.74, p = .188], SFM [H(1) = .01, p = .925] or SWB [H(1) = .11, p = .737]. Marital status also did not seem to be associated with POM, SFM or SWB. The Kruskal-Wallis test found no significant differences across marital status categories for POM [H(4) = .32, p = .988], SFM [H(4) = 6.47, p = .167] or SWB [H(4) = 5.47, p = .242].

An association was, however, detected for employment status (see table 12). There were no significant differences across employment status categories for SFM [H(6) = 9.64, p = .141] or SWB [H(6) = 10.72, p = .097] but significant differences were identified for POM [H(6) = 13.12, p = .041]. This significant result was followed up using pairwise comparisons with adjusted p-values (Bonferroni correction) to control for Type I errors. Despite the overall significant result, there were no significant pairwise comparison results.

Table 12

Independent-Samples Kruskal-Wallis Test Summary for Employment status and POM

Total N	75
Test Statistic	13.124[a]
Degree Of Freedom	6
Asymptotic Sig.(2-sided test)	.041

a. The test statistic is adjusted for ties.

4.4. Hierarchical K-means Cluster Analysis

The Hybrid Hierarchical K-means cluster analysis method was conducted nine times with *k* values (number of clusters) ranging from two to ten. Table 13 is a summary of the different cluster solutions' metric outputs. A two-cluster solution would only explain 42.6% of the variance in the dataset, which was deemed as insufficient, and it was, therefore, excluded.

The total variance explained by the clustering also indicated that the total variance explained by the clustering did not increase substantially after $k = 5$. Based on the change of the total within-cluster sum of squares from one cluster solution to the next, after five clusters, adding an additional cluster would not substantially decrease the total within-cluster sum of squares, i.e. the homogeneity within the clusters would not substantially increase. This was further substantiated by the between-cluster sum of squares in that adding another cluster would not substantially decrease the between-cluster sum of squares (i.e. increase the heterogeneity between the clusters). Therefore, only $k = 3$, $k = 4$ and $k = 5$ was considered going forward.

Table 13

Cluster solution properties

Number of clusters (*k*)	Cluster sizes	Total within-cluster sum of squares	Between-cluster sum of squares	Total variance explained by clustering (%)
2	68, 13	91.772	68.227	42.6
3	37, 31, 13	45.133	114.867	71.8
4	36, 20, 11, 14	33.533	126.467	79.0
5	23, 18, 11, 12, 17	22.691	137.309	85.8
6	22, 9, 10, 10, 13, 17	17.974	142.026	88.8
7	22, 6, 10, 9, 13, 17, 4	16.311	143.689	89.8
8	12, 12, 6, 10, 8, 12, 17, 4	13.738	146.261	91.4
9	10, 12, 6, 10, 9, 6, 17, 7, 4	11.557	148.443	92.8
10	10, 12, 6, 10, 9, 6, 6, 11, 7, 4	9.634	150.366	94.0

Six validity indexes were calculated (see table 14). The Calinski–Harabasz index indicated that five would be the optimal number of clusters. According to the Trace WiB index/criterion and the S_Dbw index $k = 4$ would be optimal. The Average Silhouette Width indicated a three-cluster solution while the Dun index identified a five-cluster solution as optimal. Lastly, the graphical output of the Elbow method (see figure 3) indicated that a four-cluster solution would be optimal.

Table 14

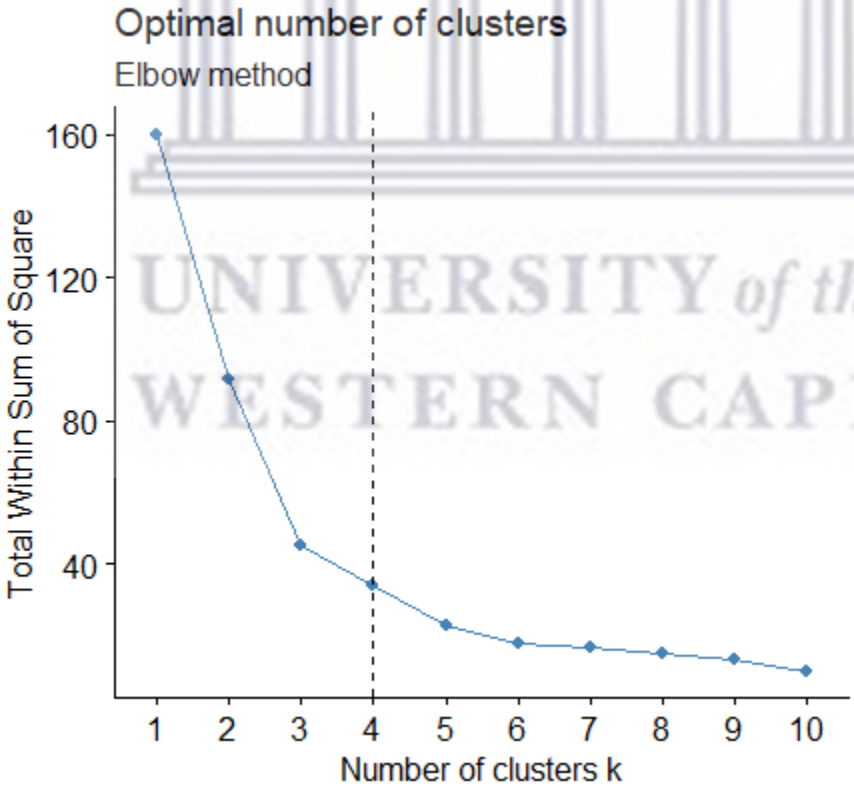
Cluster validation tests

Cluster validation indexes	Number of clusters (k)		
	3	4	5
Cakinski-Harabasz index	99.258	96.798	114.975*
Trace WiB index/criterion	5.042	7.632*	12.867
Average Silhouette Width	0.502*	0.468	0.471
Dunn index	0.063	0.081	0.183*
S_Dbw validity index	2.114	2.031*	2.314

* Optimal number of clusters

Figure 3

HK Cluster Solution Elbow method



Based on the above results and a visual comparison of the $k = 3$, $k = 4$ and $k = 5$

dendrograms (figures 4 to 6), a four-cluster solution was selected.

Figure 4

Three-cluster dendrogram

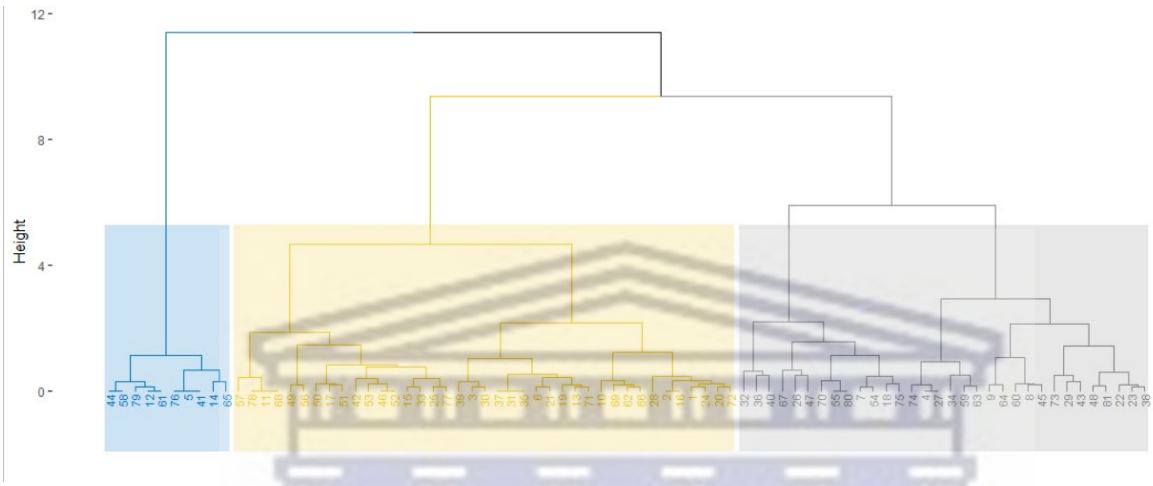


Figure 5

Four-cluster dendrogram

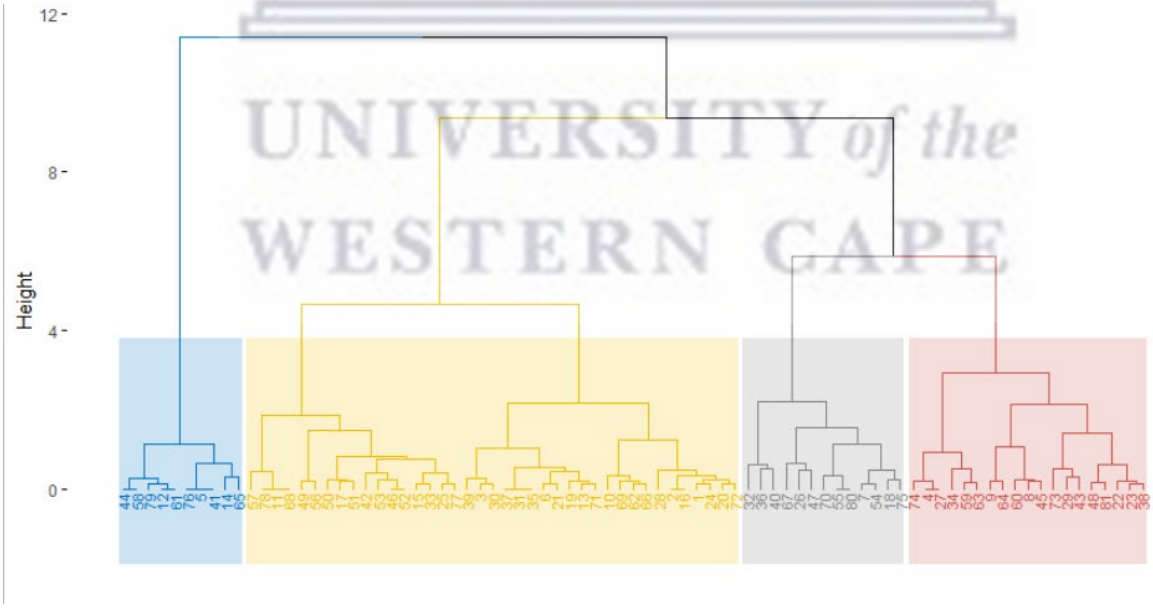
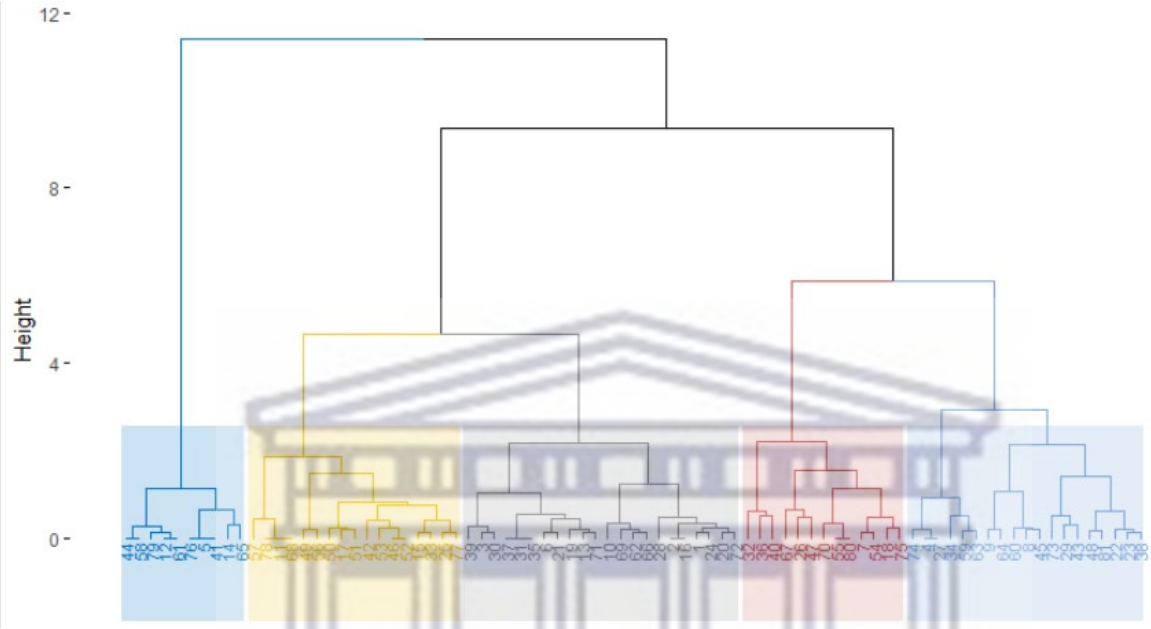


Figure 6

Five-cluster dendrogram



Finally, the clusters were labeled. As a four-cluster solution was selected, the 50th percentile (see table 15) was used to classify a centroid value as either low or high. Based on this POM scores below or equal to 27 were considered as low and scores above 27 were considered as high. As POM and SFM had the same 50th percentile, the same rules were applied to the POM scores.

Table 15

Presence of Meaning and Search for Meaning in Life Quartiles

		Presence of meaning in life	Search for meaning in life
Percentiles	25	22.00	21.00
	50	27.00	27.00
	75	32.50	32.00

The first cluster's POM centroid (30.11) and SFM centroid (29.92) were both above 27, therefore, it was labeled as High POM – High SFM. The second cluster's POM centroid (18.75) was below 27 and its SFM centroid (28.75) was above 27, therefore, it was labeled as Low POM – High SFM. The third cluster's POM centroid (33.45) was above 27 and its SFM centroid (8.18) was below 27, therefore, it was labeled as High POM – Low SFM. And the last cluster's POM centroid (23.79) and SFM centroid (20.21) was below 27, therefore, it was labeled as Low POM – Low SFM (see table 16).

Table 16

Cluster Centroid Labelling

Cluster	Presence of meaning in life centroid	Search for meaning in life centroid	Label based on 50th percentile	
			Presence	Search
1	30.11111	29.916667	High	High
2	18.75000	28.750000	Low	High
3	33.45455	8.181818	High	Low
4	23.78571	20.214286	Low	Low

The four clusters produced by the four-cluster solution were shown to be distinctly different which is a further indication of the clustering's validity.

4.5. Analysis of Variance

A one-way independent analysis of variance (ANOVA) was conducted using the POM/SFM clusters identified during the hybrid hierarchical k-means cluster analysis as the independent variable and SWB as the dependent variable. The output obtained can be viewed in table 17. The ANOVA produced a significant result, $F(3, 77) = 13.26$, $p < .001$, with SWB explaining 34.1% of the variance ($\eta_p^2 = .341$). This indicates POM/SFM cluster membership has a significant effect on levels of SWB.

Table 17

Analysis of Variance (ANOVA)

Subjective wellbeing

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13494.364	3	4498.121	13.257	<,001
Within Groups	26126.525	77	339.306		
Total	39620.889	80			

The ANOVA was followed up with post-hoc tests (see table 18 for output). The Tukey-Kramer post-hoc test revealed the mean scores for SWB was significantly different between the Low Presence – High Search cluster, the High Presence – Low Search cluster ($p < .001$), High Presence – High Search cluster ($p < .001$) and Low Presence – Low Search cluster ($p = .012$). The mean difference of the Low Presence – High Search cluster ($M = 98.25$; $SD = 19.86$) was smallest for the Low Presence – Low Search cluster ($M = 118.50$; $SD = 16.43$), then the High Presence – High Search cluster ($M = 128.69$; $SD = 20.04$) and was greatest for the High Presence

– Low Search cluster (*M* = 130.82; *SD* = 10.37). There were no significant statistical differences between the remaining clusters for SWB.

Table 18

Post-hoc Multiple Comparisons

Dependent Variable: Subjective wellbeing
Tukey-Kramer

(I) POM/SFM clusters	(J) POM/SFM clusters	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
High Presence – Low Search	High Presence – High Search	2.124	6.346	.987	-14.54	18.79
	Low Presence – Low Search	12.318	7.422	.352	-7.17	31.81
	Low Presence – High Search	32.568*	6.915	<,001	14.41	50.73
High Presence – High Search	High Presence – Low Search	-2.124	6.346	.987	-18.79	14.54
	Low Presence – Low Search	10.194	5.802	.302	-5.04	25.43
	Low Presence – High Search	30.444*	5.137	<,001	16.95	43.93
Low Presence – Low Search	High Presence – Low Search	-12.318	7.422	.352	-31.81	7.17
	High Presence – High Search	-10.194	5.802	.302	-25.43	5.04
	Low Presence – High Search	20.250*	6.419	.012	3.39	37.11
Low Presence – High Search	High Presence – Low Search	-32.568*	6.915	<,001	-50.73	-14.41
	High Presence – High Search	-30.444*	5.137	<,001	-43.93	-16.95
	Low Presence – Low Search	-20.250*	6.419	.012	-37.11	-3.39

*. The mean difference is significant at the 0.05 level.

4.6. Chapter summary

This chapter provided and explained the results of the statistical analyses that were conducted.

The results from the pilot study indicated the need to make changes to three of the demographic items and to add response examples to the MLQ and OHQ sections.

The initial tests of association identified several significant relationships. Both the Pearson's correlation and Kendal's tau results indicated a positive association between POM and SFM. The results for the association between POM and SFM, however, were mixed, with the Pearson correlation indicating a significant negative association, while Kendall's tau found no significant association. POM was found to have a significant association with home mobility and employment status, SFM was associated with age and treatment frequency and SWB was associated with home mobility.

The validity techniques used during the HK cluster analysis with the POM and SFM data, revealed a four-cluster solution to be the best fit. An ANOVA was then used to determine the association between the POM/SFM clusters and SWB. The significant ANOVA result was followed up with Tukey-Kramer post-hoc testing which revealed that the SWB of the Low Presence – High Search cluster differed significantly from all the other clusters. The remaining cluster comparisons did not yield significant results.

Chapter five: Discussion and conclusion

5.1. Discussion

The present study examined the relationship between POM and SFM, and SWB in persons with chronic diseases. It also examined the relationships of POM, SFM and SWB with certain demographic variables. The following is a discussion of the results.

The correlations conducted as an initial investigation offered some insight into the relationships between the three primary variables, and the relationships between the primary and demographic variables. The Pearson correlation indicated a small, negative relationship between POM and SFM while the Spearman's rho results showed no relationship. This mixed finding is, interestingly, in line with previous research. Costanza et al. (2020) found that POM and SFM was not related, while Park et al. (2010) and Dezutter et al. (2013) found a weak negative association between POM and SFM. This result reveals that POM and SFM are related but also independent of one another. It is, therefore, important to measure each independently as the presence of the one does not indicate an absence of the other. E.g. an individual can experience his/her life as having significant meaning, while also actively searching for meaning.

As expected, there was a strong, positive association between POM and SWB. In other words, experiencing life as meaningful and perceiving one's life as having purpose is associated with experiencing positive affect and satisfaction with life. However, as this association was established through correlation analysis, the cause-and-effect of the association cannot be established (Field, 2017; Hair et al., 2019). POM has consistently been found to be associated with SWB (Li et al., 2021; Steger et al., 2006, 2009).

The absence of a significant association between SFM and SWB is rather revealing. As discussed during the literature review, some researchers (e.g. Costanza et al., 2020; Steger, 2016;

Steger et al., 2008) have proposed that SFM by itself may not be indicative of dysfunctionality and the role of the combination of SFM and POM should be considered. Not detecting an association between SFM and SWB may provide support for this stance. It should, however, be noted that several previous studies, including one South African study, found a significant negative association between SFM and SWB (Nell, 2014b; Park et al., 2010; Steger et al., 2009).

The negative correlation between SFM and age suggest that younger participants experienced a greater and more intense desire to identify meaning, significance and purpose in their lives, compared to older participants. Prior research on the link between SFM and age are mixed, with some studies finding the same negative association as found in this study (Park et al., 2010), while other studies found no significant associations (Costanza et al., 2020; Dezutter et al., 2013; Park et al., 2010). It is interesting to note the association between POM and age is well established (Costanza et al., 2020; Park et al., 2010; Steger et al., 2006) and yet the current study did not find an association. As the other studies were conducted with "healthy" participants, this finding may reflect that the presence of a chronic disease impacts or inhibits the effect of age on POM. One explanation could be that the consequences (negative impacts on physical health, psychological health, interpersonal relationships, financial status, etc.) of living with a chronic disease which may worsen due to the degenerative nature of many chronic diseases (Papadakis et al., 2022) leads to a loss of experience of MIL. But this is speculation and further research to investigate this is needed.

The absence of an association between the duration since the person was first diagnosed with a chronic disease and POM, SFM, and SWB was surprising, especially as prior research had identified an association between illness duration and psychological distress (Alzahrani et al., 2019). However, the item used to measure illness duration had the lowest response rate of all the

items. It is possible the result reflects a problematic or difficult item, instead of the absence of associations. As with illness duration, the study did not identify any associations between marital status and POM, SFM or SWB. This was unexpected as relationships are regularly cited as an important source of MIL in both international (Costanza et al., 2020) and local literature (Mason, 2014; Nell, 2014a) and different studies have found an association between marital status and SWB (Cramm et al., 2010, 2012).

The ability to function independently (without the assistance of another person or device, e.g. wheelchair) within one's home was associated with both POM and SWB, though interestingly, the ability to function independently outside of one's home was not related to any of the primary variables. This finding was unexpected as it was hypothesised that the loss of physical autonomy and the need to rely on someone or something else, both within and outside of the participants home, would have a negative impact on SWB and POM. The lack of association with the out of home mobility, may be due to the person going out less because of the loss of physical autonomy and, therefore, it does not affect the person. Prior research identified an association between activity limitations and SWB but only when controlling for demographic factors and the availability of assistance (Zahuranec et al., 2017). This may explain the lack of a significant association between outside of home functioning and SWB. They did, however, establish significant inverse associations among SWB and eating difficulty, SWB and pain that causes limited activity and SWB and "restricted participation in valued life activities" (Zahuranec et al., 2017, p. 949). This reveals that it is not the loss of physical autonomy alone that impacts SWB and MIL, but rather the consequences of loss of physical autonomy (i.e. the restriction of doing meaningful activities) causes reduction in SWB. Therefore, the findings of this study are somewhat supported by previous research.

As with other studies (Park et al., 2010; Steger et al., 2006, 2009) gender was not associated with participants' experience of POM, SFM or SWB. The frequency with which participants received treatment negatively impacted their SWB.

Participants' employment status had a significant effect on their POM and this finding is supported by other research (Costanza et al., 2020). This association seems apparent, especially as work is one of the main sources of meaning in life (Frankl, 1965, 2008). However, when further analysis was done to identify which employment categories differed, no significant results were found. It is possible that no effect was detected due to the small sample size (Field, 2017).

The main aim of the study was to examine the relationship between POM and SFM, and SWB in persons with chronic diseases. It was hypothesised that different combinations of POM levels and SFM levels would be associated with different levels of SWB and would follow a specific sequence (e.g. the combination of higher POM and lower SFM would be indicative of a higher level of SWB compared to the combination of lower POM and higher SFM). To test this hypothesis, POM and SFM data was subjected to HK cluster analysis and four distinctive MIL profiles, each with its own unique mean of POM and SFM, were identified.

The Low Presence – High Search cluster was significantly different from the Low Presence – Low Search cluster (mean difference -20.25), High Presence – High Search cluster (mean difference -30.44) and High Presence – Low Search cluster (mean difference -32.57). Based on the significant mean differences produced, the null hypothesis for the forth hypothesis was rejected.

Despite none of the other groups having significant differences, the mean differences for the Low Presence-High Search group does offer some insights. First, it provides evidence for the

conclusion that there is an association between the distinctive POM and SFM profiles and SWB. It also offers insight into the interplay between POM and SFM and the effect this has on the SWB of persons suffering from chronic diseases. For example, participants in the Low Presence – Low Search group experienced significantly higher levels of SWB compared to those in the Low Presence – High Search group. Although both groups experienced low levels of MIL, the absence, or lack of a strong, intense desire to find meaning, significance and purpose in life may lessen the negative impact a lack of presence of meaning has on SWB. Dezutter et al. (2013), who had a similar finding, suggested this indicates that the absence of POM causes the person's SFM to be a stressful search. Participants in the High Presence – High Search group also experienced significantly higher levels of SWB (even greater than those in the Low Presence – Low Search group) compared to those in the Low Presence – High Search group and from this it can be deduced that when High Search is combined with High Presence, the POM seems to minimise the negative impact SFM has on SWB.

These findings are also in line with previous studies with both healthy participants (Cohen & Cairns, 2012; Dezutter et al., 2014) and participants living with chronic diseases (Dezutter et al., 2013). In their study with persons with chronic diseases in the Netherlands, Dezutter et al. (2013) identified a similar four cluster solution, but they were also able to detect significant differences among all groups. The findings of this study also lends support for Costanza et al. (2020), Steger (2016) and Steger et al.'s (2008) argument that SFM itself is not indicative of dysfunctionality or maladjustment, but rather the absence of POM causes a stressful, anxious SFM.

5.2. Conclusion

In summary, the findings suggest that persons who experience their lives as lacking meaning, also experience lower SWB (i.e. less positive affect, more negative affect and less life satisfaction). It further suggests that POM may act as a buffer against the negative impact SFM may have on SWB. The results seem to reveal that experiencing one's life as absent of meaning, causes a stressful search, which negatively impacts SWB.

The study was exploratory and the sample size was small, however, the findings are, in part, substantiated by previous international studies. SFM and POM, although both dimensions of MIL, seem to function independently, and yet have an interactional effect on SWB. A model that includes both constructs seems to explain and could possibly predict SWB more accurately than using only one. As this study is the first of its kind in South Africa, the results and implications for future research is exciting. Further research, using a larger sample size and employing a stratified sampling method (to ensure the sample is representative of South Africans living with chronic diseases), is needed to validate and verify the results of the study.

What can be stated with confidence is the need to start placing greater emphasis on the mental wellbeing of people suffering from chronic disease. Merely focusing on the physiological health of patients and using treatments that may extend patients' lifespan is not sufficient. The psychological health of persons with chronic disease should be considered and must form part of any treatment plan.

The ultimate, overarching aims of this study were to emphasise the importance of the mental health of persons living with chronic diseases, the gaps on this topic within South Africa and the impact meaning-centred therapies and interventions may have to promote and support greater wellbeing for those living with chronic disease.

5.3. Limitations

The limitations of the study are within its design. Although exploratory research is essential, especially within the social sciences, the findings of exploratory studies are not definitive (Babbie, 2021) and, therefore, the results of the study should be seen within this context. The sample size was small and the sampling method may have caused sampling bias. Ultimately, the study participants were likely not representative of all South Africans living with chronic diseases and, therefore, these results cannot be generalised. The results do, however, indicate further research within this field is warranted. It is recommended that future research should employ a stratified or similar sampling technique which will ensure a representative sample is included and the use of a larger sample size. This will allow for the generalisation of findings (Field, 2017). It is further recommended that future work also include intervention programmes which focus on increasing meaning in life, that are designed, implemented and assesed in conjunction with healthcare professionals, and persons' with chronic diseases.

Abbreviations

HK	Hierarchical k-means cluster analysis
LMIC	Low- and middle-income countries
MIL	Meaning in life
MLQ	Meaning in Life Questionnaire
MLQ-P	Presence of meaning in life subscale
MLQ-S	Search for meaning in life subscale
OHQ	Oxford Happiness Questionnaire
POM	Presence of meaning in life
SFM	Search for meaning in life
T2DM	Type 2 diabetes mellitus
WHO	World Health Organisation

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Appendix A: BMREC ethics approval

UNIVERSITY of the WESTERN CAPE

60 YEARS of hope, action & knowledge

08 April 2020

Ms A Bedeker
Psychology
Faculty of Community and Health Sciences

Ethics Reference Number: BM20/2/8

Project Title: Meaning in life and wellbeing in persons suffering from chronic disease in Cape Town, South Africa.

Approval Period: 06April 2020 – 06 April 2023

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report annually by 30 November for the duration of the project.

Permission to conduct the study must be submitted to BMREC for record-keeping.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

Director: Research Development
University of the Western Cape
Private Bag X 17
Bellville 7535
Republic of South Africa
Tel: +27 21 959 4111
Email: research-ethics@uwc.ac.za

NHREC Registration Number: BMREC-130416-050

FROM HOPE TO ACTION THROUGH KNOWLEDGE.

Appendix B: Western Cape Department of Health and Tygerberg Hospital ethics approval

Western Cape Government
Health

TYGERBERG HOSPITAL
REFERENCE:
Research Projects
ENQUIRIES: **Dr GG Marinus**
TELEPHONE:**021 938 5752**

Ethics Reference: BM20/2/8

TITLE: **Meaning in life and wellbeing in persons suffering from chronic disease in Cape Town, South Africa.**

Dear Ms A Bekker

PERMISSION TO CONDUCT YOUR RESEARCH AT TYGERBERG HOSPITAL.

1. In accordance with the Provincial Research Policy and Tygerberg Hospital Notice No 40/2009, permission is hereby granted for you to conduct the above-mentioned research here at Tygerberg Hospital.

2. Researchers, in accessing Provincial health facilities, are expressing consent to provide the Department with an electronic copy of the final feedback within six months of completion of research. This can be submitted to the Provincial Research Co-Ordinator (Health.Research@westerncape.gov.za).

Dr. G.G. Marinus
MBChB,MPA,
DHM
MP0370665
Manager:Medical Services

DR GG MARINUS
MANAGER: MEDICAL SERVICES - RESEARCH

Date: 11/11/2020

Administration Building, Francie van Zijl Avenue, Parow, 7500 Private Bag X3, Tygerberg, 7505
tel: +27 21 938-6267 fax: +27 21 938-4890 www.capegateway.go.v.za

Ethics Reference: BM20/2/8

TITLE: **Meaning in life and wellbeing in persons suffering from chronic disease in Cape Town, South Africa.**

BY _____ [SIGNATURE]

An authorized representative of Tygerberg Hospital

NAME GRANVILLE MARINUS

TITLE MANAGER: MEDICAL SERVICES - RESEARCH

DATE 12 DECEMBER 2020

Appendix C: Consent form

CONSENT FORM

Title of Research Project: **Meaning in life and wellbeing in persons suffering from chronic disease in Cape Town, South Africa.**

The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

Participant's name……..

Participant's signature…….

Date……

Biomedical Research Ethics Committee
University of the Western Cape
Private Bag X17
Bellville
7535
Tel: 021 959 4111
E-mail: research-ethics@uwc.ac.za

Appendix D: Information Sheet

INFORMATION SHEET

Title of Research Project: Meaning in life and wellbeing in persons suffering from chronic disease in Cape Town, South Africa.

What is this study about?

This study aims to explore the relationship between meaning in life, subjective wellbeing, and demographic characteristics among persons with chronic diseases in Cape Town, South Africa. More specifically, we are interested in how the presence and search for meaning in life affects the subjective wellbeing of persons with chronic diseases and the effect demographic characteristics (such as age and gender) have on presence and search for meaning in life.

What will you be asked to do if you agree to take part?

If you agree to participate, you will be asked to sign an informed consent form, and thereafter, complete a questionnaire. Participation should take approximately 15 minutes.

Would my participation in this study be kept confidential?

The study is conducted with complete anonymity and you are not required to provide any of your personal identifying information on the questionnaire. However, if you wish to receive feedback on your personal results from the questionnaire and/or the results of the study, your personal information (name, surname and e-mail address) will be captured on a separate form that will contain the unique number on your questionnaire. Only the researcher and her supervisor will have access to the collected data.

What are the risks of this research?

Any research study involving human participants carry some degree of risk. The topic and nature of this study may illicit negative emotional responses. If you experience any discomfort or distress during or after participation in this study, the following free counselling services can be contacted: Lifeline (0861 322 322), Hope House (021 522 9228) and the South African Depression and Anxiety Group (0800 456 789). If further assistance is required, please contact the researcher, her supervisor or the Department of Psychology of the University of the Western Cape.

What are the benefits of this research?

The research will expand current knowledge of the relationship between meaning in life and

wellbeing which can aid in the creation of therapeutic/intervention programmes for persons with chronic diseases. Dissemination of the results may also call attention to the struggles of persons suffering from chronic diseases and the need for psychological intervention.

Results of the study as well as individual results from the questionnaire you completed will be shared with you if you wish to receive feedback.

Do you have to be in this research and may you stop participating at any time?

Your participation in this study is completely voluntary, and you can withdraw your participation at any time without prejudice. Your decision to participate or not to participate will have no effect on the service you receive at Tygerberg Hospital.

What if I have questions?

If you have any questions about the research study itself, please contact: Anja Bedeker at: Department of Psychology, University of the Western Cape, Robert Sobukwe Road, Bellville, 7535, +2784 5690180, or abedeker@uwc.ac.za

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Supervisor
Professor Kelvin Mwaba
Department of Psychology, UWC
021 959 2283
kmwaba@uwc.ac.za

Dean of the Faculty of Community and Health Sciences
Professor Anthea Rhoda
University of the Western Cape
Private Bag X17, Bellville 7535
arhoda@uwc.ac.za

Head of Department
Dr Maria Florence
Department of Psychology, UWC
021 959 2827
mflorence@uwc.ac.za

Biomedical Research Ethics Committee
University of the Western Cape
Private Bag X17, Bellville 7535
Tel: 021 959 4111
E-mail: research-ethics@uwc.ac.za

Appendix E: Questionnaire

UNIVERSITY of the WESTERN CAPE

University of the Western Cape
Department of Psychology
Private Bag X17, Bellville, 7535, South Africa
Telephone: Tel.: +27 21 959 2283
E-mail: abedeker@uwc.ac.za

MEANING IN LIFE AND WELLBEING IN PERSONS SUFFERING FROM CHRONIC DISEASE IN CAPE TOWN, SOUTH AFRICA.

Thank you for taking the time to complete this questionnaire. The questionnaire consists of three sections. The first section asks questions relating to your background, section two relates to questions regarding meaning in life and the last section asks questions about your wellbeing. The questionnaire should take approximately 15 minutes to complete.

Participation is voluntary, you can withdraw at any time and your identity will remain anonymous. Please answer the questions as honestly as possible and follow the instructions for each section.

SECTION 1: DEMOGRAPHIC INFORMATION

Instructions: Please answer the following questions by writing the answers in the spaces provided or by making a tick next to the applicable answer.

1.1. Age

1.2. Gender

	Female
	Male
	Other

1.3. Marital Status

	Never married
	Married
	Divorced / Separated
	Widowed

	Other

1.4. In what year were you diagnosed with your current chronic disease?

1.5. Are you able to move about your home without assistance from a person and/or apparatus (e.g. wheelchair, crutches, etc.)?

	Yes, always
	Yes, sometimes
	No, never

1.6. Are you able to function outside of your home without assistance from a person and/or apparatus (e.g. wheelchair, crutches, etc.)?

	Yes, always
	Yes, sometimes
	No, never

1.7. How frequently do you receive medical/physical treatment from a doctor, nurse or other medical health professional?

	Daily
	Several times a week
	Several times a month
	Less than once a month

1.8. What is your current employment status?

	Employed
	Unemployed
	Retired
	Disabled
	Volunteer
	Student
	Other

SECTION 2: MEANING IN LIFE QUESTIONNAIRE

Please take a moment to think about what makes your life feel important to you. Please respond to the following statements as truthfully and accurately as you can, and also please remember that these are very subjective questions and that there are no right or wrong answers. Please answer according to the scale below:

Absolutely untrue	Mostly untrue	Somewhat untrue	Can't say true or false	Somewhat true	Mostly true	Absolutely true
1	2	3	4	5	6	7

EXAMPLE:

I enjoy watching TV. 5

1. I understand my life's meaning. _____
2. I am looking for something that makes my life feel meaningful. _____
3. I am always looking to find my life's purpose. _____
4. My life has a clear sense of purpose. _____
5. I have a good sense of what makes my life meaningful. _____
6. I have discovered a satisfying life purpose. _____
7. I am always searching for something that makes my life feel significant. _____
8. I am seeking a purpose or mission for my life. _____
9. My life has no clear purpose. _____
10. I am searching for meaning in my life. _____

SECTION 3: THE OXFORD HAPPINESS QUESTIONNAIRE

You will need to read the statements carefully because some are phrased positively and others negatively. Don't take too long over individual questions; there are no 'right' or 'wrong' answers and no trick questions. The first answer that comes into your head is probably the right one for you. If you find some of the questions difficult, please give the answer that is true for you in general or for most of the time.

INSTRUCTIONS. Below are a number of statements about happiness. Would you please indicate how much you agree or disagree with each by entering a number alongside it according to the following code:

Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree
1	2	3	4	5	6

1. I don't feel particularly pleased with the way I am. _____
2. I am intensely interested in other people. _____
3. I feel that life is very rewarding. _____
4. I have very warm feelings towards almost everyone. _____
5. I rarely wake up feeling rested. _____
6. I am not particularly optimistic about the future. _____
7. I find most things amusing. _____
8. I am always committed and involved. _____
9. Life is good. _____
10. I do not think that the world is a good place. _____
11. I laugh a lot. _____
12. I am well satisfied about everything in my life. _____
13. I don't think I look attractive. _____
14. There is a gap between what I would like to do and what I have done. _____
15. I am very happy. _____
16. I find beauty in some things. _____
17. I always have a cheerful effect on others. _____
18. I can fit in everything I want to. _____
19. I feel that I am not especially in control of my life. _____
20. I feel able to take anything on. _____
21. I feel fully mentally alert. _____
22. I often experience joy and elation. _____
23. I do not find it easy to make decisions. _____
24. I do not have a particular sense of meaning and purpose in my life. _____
25. I feel I have a great deal of energy. _____
26. I usually have a good influence on events. _____
27. I do not have fun with other people. _____

28. I don't feel particularly healthy. _____

29. I do not have particularly happy memories of the past. _____

END OF QUESTIONNAIRE