

**Perceptions of Health-Related Quality of Life among Adults living with Sickle Cell Disease in  
Cape Town, South Africa**

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## **DECLARATION**

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## **ABSTRACT**

Sickle cell disease (SCD) is a chronic, heritable blood disorder with affected individuals suffering from debilitating health issues and requiring frequent hospitalisation. SCD is highly prevalent in areas of the world where malaria is endemic and specifically in Sub-Saharan African (SSA) region from where a number of migrants flee to South Africa. This has resulted in increased numbers of patients with SCD in the South African healthcare system requiring holistic treatment and care, and ultimately improvement of their health-related quality of life (HRQL). There is limited empirical information on issues related to HRQL in SCD in Africa, with none available on adults living with SCD in South Africa.

For this reason, this study was carried out with the aim of qualitatively exploring the perceptions of HRQL in adult patients with SCD at Groote Schuur Hospital in Cape Town. Participants were selected from Groote Schuur Hospital, a tertiary referral hospital in Cape Town, South Africa using a purposive sampling method. Participants were asked about how their condition affected physical and psychological functioning, effects of their health on relationships and social issues such as education and employment opportunities as well as discrimination. Perceptions of access to and satisfaction with healthcare, coping strategies and independent living skills were also explored. The data collected for this study were analysed using the framework approach and thematic content analyses methods.

Results suggest that participants believed their functioning was affected by the constant and unpredictable nature of SCD clinical events, and this was seen to have social, financial and psychological implications. Environmental factors such as weather, activity and psychological state had significant impact on participants' health, with pain being a common complication of the condition often making coping with the condition difficult. Participants also experienced health-related discrimination and stigma in personal and social relationships and within the workplace often with negative emotional consequences. Both the positive and negative experiences with healthcare were also described. Participants found ways to cope with their condition but it appeared that SCD had more of a negative overall impact on various domains of HRQL for participants.

Insights in to the impact of SCD on adult patients is important to allow for healthcare professionals to better understand patient needs and to implement more effective coping and self-management strategies appropriate for their patients. It also allows for genetic counselling services to be better tailored to addressing the concerns and needs of patients to provide better educational and psychosocial support.

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## **LIST OF TERMS AND ABBREVIATIONS:**

BT – Blood transfusions

DRC – Democratic Republic of Congo

Glu – Glutamic acid

Gln – Glutamine

HbA – Adult Haemoglobin

HBB – Haemoglobin subunit beta gene

HIV – Human Immunodeficiency virus

HPFH – Hereditary persistence of foetal haemoglobin

HRQL – Health-related quality of life

HSCT – Haematopoietic stem cell transplantation

Ile – Isoleucine

Lys – Lysine

NOR – none on record

PiSCES – Pain in Sickle Cell Epidemiology Study

PRO – Patient reported outcomes

PROMIS® – Patient reported outcome measurement information system

QOL – Quality of life

RCWMH – Red Cross War Memorial Hospital

SCA – Sickle cell anaemia

SCD – Sickle cell disease

SCT – Sickle cell trait

SF-36 – Short form 36

SSA – Sub-Saharan Africa

Val – Valine

VOC – Vaso-occlusive crises

WHO – World Health Organisation

WHOQOL-BREF– World Health Organisation quality of life BREF

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# CHAPTER 1: INTRODUCTION AND LITERATURE REVIEW

## 1.1 Introduction

This research study was conducted to explore the perceptions of Health-Related Quality of Life (HRQL) in adult sickle cell disease (SCD) patients in Cape Town, Western Cape. HRQL is the patient's assessment of how they feel their health affects their well-being and level of functioning in comparison to what is perceived as ideal (Panepinto & Bonner, 2012). To date very little SCD-related HRQL research has been carried out in Africa (Wonkam *et al.*, 2014a), and to the best of our knowledge no research has been carried out to explore HRQL in adults with SCD in the Western Cape region. Thus, there is an urgent need to understand HRQL in these populations to allow for healthcare professionals to provide adequate medical care services including genetic counselling, therapeutic and other relevant support options.

This chapter serves as an introduction to the topic and provides an overview of the literature pertaining to SCD. A literature search was conducted to see what research has already been conducted on this topic. The following databases were searched: PubMed and Google Scholar. The following search terms were employed: *Sickle cell disease, sickle cell, management, prognosis, psychosocial, quality of life, health-related quality of life, genetic counselling* and variations of these terms were also employed to access literature.

The literature review covers the genetic aetiology, epidemiology of SCD (both globally and on the African continent), and an overview of its pathophysiology, prognosis and management considerations. HRQL issues with regard to SCD are presented, discussing psychosocial challenges for adults living with SCD, along with genetic services in South Africa and the importance of genetic counselling in SCD. This chapter also serves to lay the groundwork for the rationale behind the study's aims and objectives.

## 1.2 Literature Review

### 1.2.1 Definition and genetic aetiology of sickle cell disease

The term SCD refers to a group of chronic, heritable recessive blood disorders characterised by the presence of sickle haemoglobin or haemoglobin S (HbS) (Makani *et al.*, 2013). SCD is a multi-systemic condition associated with acute episodes of illness and health complications ranging from chronic anaemia, recurrent pain episodes caused by vaso-occlusive events, increased susceptibility to infections, increased risk for stroke and vulnerability of organs to organ damage (Piel, Steinberg & Rees, 2017; Reese, Williams & Gladwin, 2010). SCD can be a debilitating condition with

symptoms emerging in early childhood. The severity of symptoms is on a spectrum with some experiencing milder symptoms while others may experience more serious complications, often requiring hospitalisation (Makani *et al.*, 2013).

SCD was first documented in Western literature in 1910 by Dr James Herrick who noted that his patient had severe anaemia. Upon examination of a blood sample it was seen that the patient's erythrocytes were irregular, with many of them being thin, elongated and sickle-shaped (Herrick, 2001). In 1949, the first pathophysiological findings of SCD emerged whereby Linus Pauling and colleagues were the first to show that abnormal protein production could be the cause of this genetic condition. Later, in 1956, Vernon Ingram discovered that the cause of SCD was a point mutation within the haemoglobin  $\beta$  gene (*HBB*) gene that results in a substitution of the amino acid valine for glutamic acid at the sixth position ( $\beta 6\text{Glu}\rightarrow\text{Val}$ ) of the  $\beta$ -globin chain. In the 1960's and 1970's the pathophysiological system behind SCD was further delineated helping scientists to better understand the basic mechanistic events of the disorder (Odièvre *et al.*, 2011).

Worldwide, SCD is the most common monogenic condition and is an umbrella term for disorders whereby the structure, function and production of haemoglobin is altered (Nnaji *et al.*, 2013). Haemoglobin is an essential protein molecule responsible for carrying oxygen from the lungs to all tissues in the body, and then returning carbon dioxide from those tissues back to the lungs. Haemoglobin is a tetramer protein molecule that consists of two different pairs of globin chains. Adult haemoglobin (HbA) consists of two alpha-globin chains combined with two beta-globin chains ( $\alpha_2\beta_2$ ) and adult haemoglobin A2 (HbA2) consists of two alpha-chains combined with delta-chains ( $\alpha_2\delta_2$ ). HbA makes up 95-98% and HbA2 about 2-3% of haemoglobin in adults. Foetal haemoglobin (HbF) consists of two alpha-chains and two gamma-chains ( $\alpha_2\gamma_2$ ) and makes up about 1-2% of all haemoglobin in adults (Bauer, Kamran & Orkin, 2012; Weatherall & Clegg, 2001).

In affected individuals, the point mutation within the *HBB* gene that results in a  $\beta 6\text{Glu}\rightarrow\text{Val}$  amino acid substitution causes production of abnormal  $\beta$ -globin chains. These abnormal  $\beta$ -globin chains polymerise and precipitate during deoxygenation and dehydration forming HbS and subsequently sickle shaped erythrocytes. HbS polymerisation is due to increased bonding strength between valine and complementary sites in adjacent globin chains (Stuart & Nagel, 2004), and depends on the levels of HbS within erythrocytes, cell oxygen levels, pH and HbF concentrations. Polymerisation of HbS disrupts cell flexibility, with the altered erythrocyte structure, from a normal biconcave shape to a crescent, being the vascular pathological basis of the disease (Bartolucci & Galacteros, 2012; Reese, Williams & Gladwin, 2010; Rees *et al.*, 2010; Stuart & Nagel, 2004; Yawn *et al.*, 2014).

In all forms of SCD, at least one of the two abnormal *HBB* genes causes the production of HbS. When an individual has both *HBB* genes producing HbS (HbSS) this form of the disease is called Sickle cell anaemia (SCA). In the other forms of SCD a person will inherit one *HBB* gene producing HbS and another *HBB* gene variant producing haemoglobin C, D, E or other rare structural variants. SCD can also result from inheriting a HbS variant with a quantitative  $\beta$ -thalassemia variant (see table 1 below).  $\beta$ -thalassemia variants result in decreased or absent production of  $\beta$ -globin chains and therefore HbA (Reese, Williams & Gladwin, 2010). The underlying genotype of SCD is important to understand as it determines the type/s of haemoglobin produced by the body and can be used as a proxy for the severity of the condition in affected individuals (Quinn, 2016).

SCA is the most severe and common type of SCD. SCA accounts for approximately 70% of all SCD cases in black Africans. The second most common type of SCD is haemoglobin SC disease (HbSC) cause by inheriting one HbS and one HbC allele. The third most common type of SCD is HbS inherited with a  $\beta$ -thalassemia variant (HbS/ $\beta$ -thalassaemia). There are a few other SCD genotypes found world-wide (see table 1) but the prevalence is much less common (Nagel, Fabry & Steinberg, 2003; Reese, Williams & Gladwin, 2010).

Table 1: Known SCD genotypes and characteristics – table adapted from Reese, Williams & Gladwin, 2010

<b>SCD genotype</b>	<b>Characteristics</b>
HbS/S ( $\beta$ 6Glu>Val/ $\beta$ 6Glu>Val)	SCA: Most common and severe type of SCD
HbS/ $\beta^0$ thalassemia	Highly prevalent in Eastern Mediterranean and Indian populations; can be as severe as SCA
HbS/ $\beta^+$ thalassemia	Highly prevalent in Eastern Mediterranean and Indian populations; 1-5% HbA present in severe type; 6-15% HbA present in moderate type; 16-30% HbA present in the mild form
HbS/C ( $\beta$ 6Glu>Val/ $\beta$ 6Glu>Lys)	Present in 25-35% of affected black African individuals
HbS/D Punjab ( $\beta$ 6Glu>Val/ $\beta$ 121Glu>Gln)	Highly prevalent in northern Indian populations
HbS/E ( $\beta$ 6Glu>Val/ $\beta$ 26Glu>Lys)	Uncommon due to HbE being prevalent in SE Asia; but frequency is increasing due to migration of various populations
HbS/O Arab ( $\beta$ 6Glu>Val/ $\beta$ 121Glu>Lys)	Occurs in north Africa, Middle East and Balkan states however is very rare
HbC/S Antilles ( $\beta$ 6Glu>Lys/ $\beta$ 6Glu>Val, $\beta$ 23Val>Ile)	HbC variant inherited with a double mutation in the <i>HBB</i> gene; extremely rare genotype with a severe phenotype
HbS/HPFH	A group of disorders caused by large <i>HBB</i> gene deletions; results in around 30% HbF production

### 1.2.2 Epidemiology of SCD both globally and on the African continent

In developing countries haemoglobinopathies contribute substantially to the burden of disease (Weatherall, 2008). Worldwide, approximately 70 million people have SCD (Alli *et al.*, 2014) with the estimated birth rate of affected babies recorded to be 312 000 annually (Saraf *et al.*, 2015). Of those affected births, around 80% are born in Sub-Saharan Africa (SSA) (Piel *et al.*, 2013). According to recent publications by the World Health Organization (WHO) it was noted that approximately 20-25 million people worldwide have SCA, the most severe form of SCD. Of these affected individuals, approximately 12-15 million reside in SSA, 5-10 million in the Indian subcontinent and the remaining 3 million are found in other regions of the world (Aliyu *et al.*, 2008; Aneke & Okocha, 2016; WHO. n.d).

Within the Sub Saharan region 5%-40% of individuals are estimated to carry the sickle cell trait (SCT) (Weatherall & Glegg, 2001). Carriers of the SCT are unaffected individuals that are heterozygous for the *HBB*  $\beta$ 6Glu $\rightarrow$ Val mutation that when inherited in a homozygous or compound heterozygous state causes SCD. SCT carriers are at risk to pass that mutation to their offspring. The occurrence and prevalence of SCD mutations is associated with five region-defined  $\beta$ -globin gene haplotypes (Pagnier *et al.*, 1984; Bitoungui *et al.*, 2015) and is associated with malaria endemicity (Williams *et al.*, 2005).

Being a SCT carrier can have a genetic advantage for malaria immunity and is seen to confer some level of protection for heterozygotes against *Plasmodium falciparum* malaria infection when compared to non-carriers (Makani *et al.*, 2013; Stuart & Nagel, 2004; Williams & Obara, 2011). The frequency of HbS in malaria endemic regions is a classic example of the balance between positive selection for the heterozygote state and negative selection against the homozygous state that causes SCD (Williams & Obara, 2011). The global distribution of the SCT can be seen in figure 1 below, matched the regions of the world where malaria has been endemic, and further aims to support the hypothesis for selection of this with *Plasmodium falciparum* (Piel *et al.*, 2010).

#### Sickle Cell Disease in South Africa

Historically, South Africa has had low prevalence of SCD (Bonafede, Botha & Beighton, 1979; Beighton & Botha, 1986). However, this is changing whereby for socio-economic reasons there has been an influx of immigrants from politically unstable countries surrounding South Africa, where SCD is highly prevalent, into South Africa. This has resulted in a 300 - 400% increase in new cases of SCD over the past 10 years at Red Cross War Memorial Children's Hospital (RCWMH) in Cape Town (Wonkam *et al.*, 2012). Similar patterns can be seen at Groote Schuur Hospital in Cape Town

with a 200% increase in the last 5 years in the use of adult patient services for SCD (Pule *et al.*, 2017).

To add complexity to the genetic picture, in the South African population themselves, mixed ancestry groups do carry certain *HBB* variants, with HbE and HbS seen more frequently (Bird, Karabus & Hartley, 1982, Pule *et al.*, 2017). The HbS variant is also more commonly seen in the South African Indian population (Reddy & Ward, 1969). The black South African population have been found to carry the SCT but SCD is very uncommon in this group as the carrier frequency is only around 0,2% (Beighton & Botha, 1986).

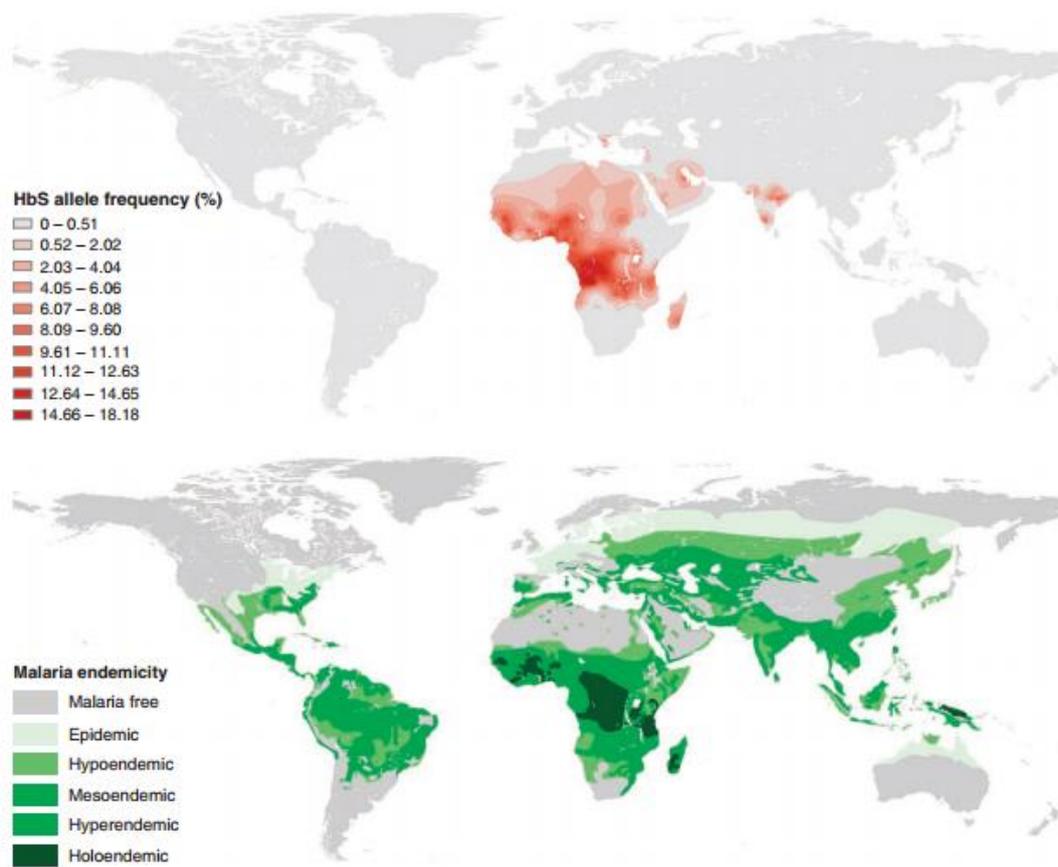


Figure 1: Distribution of the sickle cell gene (red) is seen to correspond to malaria endemic regions (green) globally (Piel *et al.*, 2010)

### 1.2.3 Pathophysiology and clinical characteristics

In humans, haemoglobin changes between embryonic, foetal and adult life with two developmental switches in expression from embryonic haemoglobin to HbF during the first three months after conception. This changes from HbF to HbA around the time of birth, with most HbF expression tapering off around 6 months after birth (Bauer, Kamran & Orkin, 2012). Since SCD affects HbA

production, signs and symptoms of SCD normally begin early in childhood, after HbF production decreases and HbS (replacing HbA in patients with SCD) expression dominates. The main typical features of this condition can be categorised into anaemia and other haematological abnormalities, episodes of pain caused by vaso-occlusive events, recurrent infections and organ damage (Makani *et al.*, 2013).

### **Vaso-occlusion**

In SCD a hallmark feature of the condition is intermittent vaso-occlusive events that result in tissue ischemia and infarction with multisystem effect (Booth, Inusa & Obaro, 2009; Odièvre *et al.*, 2011). Tissue ischemia can cause acute and chronic pain crises and infarction may lead to damage of various organs such as bones, liver, spleen, lungs, kidney, brain, joints and eyes. (Bender & Seibel, 2014; Platt *et al.*, 1991; Stuart & Nagel, 2004). Vaso-occlusive events are mainly due to HbS polymerisation as rigid and deformed erythrocytes aggregate and cause precapillary obstruction with capillaries and post-capillary venules being most vulnerable (Bartolucci & Galacteros, 2012; Booth, Inusa & Obaro, 2009; Odièvre *et al.*, 2011; Reese, Williams & Gladwin, 2010).

### **Haematological abnormalities**

Haemolytic anaemia, another main pathophysiological feature, is anaemia caused by the abnormal breakdown of erythrocytes. Individuals are not born with anaemia, chronic haemolytic anaemia develops after the decrease in HbF and increase in HbA synthesis and persists throughout one's life (Piel, Steinberg & Rees, 2017; Makani *et al.*, 2013). Chronic haemolysis is the main cause of anaemia in individuals with SCD, however patients can experience acute episodes of increased haemolysis, called "anaemic crises", that result in rapid decline in haemoglobin levels. Anaemia may also occur after malarial, bacterial or viral infection or after acute episodes of splenic sequestration, whereby erythrocytes rapidly become trapped within the spleen (Bartolucci & Galacteros, 2012; De Montalembert *et al.*, 2009).

### **Organ dysfunction and damage**

In SCD, progressive organ damage is often caused by haemolytic and vaso-occlusive events (Van Beers *et al.*, 2008) and is an important prognostic factor for patients (Bartolucci & Galacteros, 2012). The first obvious sign presents clinically as autosplenectomy, with adults often experiencing end-stage renal failure, and sometimes lung damage due to acute respiratory illness known as acute chest syndrome. They may also experience brain damage, most often due to damage of the walls of large blood vessels in the brain, retinopathy, leg ulcers and bone damage (Makani *et al.*, 2013; Powars, 1990). Such organ damage is irreversible even after intense therapy. Prevention of vaso-

occlusive and haemolytic events therefore need to be investigated as a first line clinical application in patients (Ataga *et al.*, 2017; Van Beers *et al.*, 2008; Powars, 1990).

## **Infection**

In SCD a considerable contributor to morbidity and mortality is infection. HbS increases susceptibility to infection, especially infections caused by *Streptococcus pneumoniae* and *Haemophilus influenza* (Booth, Inusa & Obaro, 2009; Yawn *et al.*, 2014). The main contributing factor to infection is impaired splenic function. The spleen functions to filter blood borne organisms, remove damaged and old cells as well as produce antibodies therefore playing a key role in immunity. In SCD the poor circulation of blood through the spleen and conditions promoting sickling often leads to congestion within splenic arteries, causing blood to bypass the spleen through other vessels and not undergo the normal filtering process (William *et al.*, 2007). In acute episodes, blood transfusion and use of hydroxyurea can reverse this process, however, after chronic episodes of splenic ischaemia, asplenism often results, meaning the spleen is no longer an effective contributor to immunity (William & Corazza, 2007). Defects in complement activation, micronutrient deficiencies and genetic and mechanical factors may also be implicated in increased susceptibility to infection (Booth, Inusa & Obaro, 2009; Prasad *et al.*, 1999).

### **1.2.4 Survival and prognosis in SCD**

Overall, survival rates of people with SCD is reduced when compared to the general population (Platt *et al.*, 1994), but with increased access to comprehensive medical care including new-born screening, vaccinations, antibiotic treatment and hydroxyurea, the survival rate for those with SCD has improved significantly with some patients living into adulthood possibly past the age of 50 years old (Bhagat *et al.*, 2014; Claster & Vichinsky, 2003; Keller *et al.*, 2014; Treadwell *et al.*, 2014). Paediatric infection used to be the main cause of fatality but with increased survival age, the cause of fatality is changing to end stage organ damage (Platt *et al.*, 1994).

In the United States of America (USA) and the United Kingdom (UK), where patients have access to comprehensive medical care, the average survival age for HbS/S and HbS/ $\beta^0$  patients is between 58 - 67 years old. For patients with the HbS/C and HbS/ $\beta^+$  forms of SCD the average survival age is 66 years old (Elmariah *et al.*, 2014; Gardner *et al.*, 2016). These patients receive comprehensive care including specialist haematology input, inpatient management by experts in the field, involvement of organ system specialists, availability of blood transfusions and a carefully planned transition for these patients from their paediatric to adult care facilities. This said the average life

expectancy for individuals with SCD is still around 2 decades shorter than the general population (Gardner *et al.*, 2016).

In SSA disease burden of SCD is high with over 70% of affected individuals coming from these regions (Makani *et al.*, 2013; Saraf *et al.*, 2014). Despite advances in understanding, management and treatment of SCD, in many African countries new-born screening, antibiotic treatments and other routine medical interventions are not always routinely implemented (Adewoyin, 2015; McAuley *et al.*, 2010; Rahemy *et al.*, 2009; Weatherall & Clegg, 2001). Patients with SCD are also limited in quality of care with access only to poor medical resources and infrastructure (Makani *et al.*, 2013). This significantly reduces HRQL and increases the rate of death due to infection by both bacterial agents and malaria in these countries (McAuley *et al.*, 2010; Weatherall & Clegg, 2001), with up to 80% of infants born with SCD in Africa dying before 5 years of age (Mulumba & Wilson, 2015).

Predictors of morbidity, mortality and HRQL in patients includes whether they live in resource rich areas, have access to comprehensive care including prophylaxis, treatment and psychosocial support, individual foetal haemoglobin levels, individual susceptibility to cerebrovascular events, frequency of hospitalisation & iron overload (Field, Vichinsky & DeBaun, 2017).

### **1.2.5 HRQL and psychosocial challenges in adults with SCD:**

#### **HRQL in SCD**

With increased access to more comprehensive medical care, the survival rate for those with SCD has increased (Claster & Vichinsky, 2003; Keller *et al.*, 2014). With this increase in lifespan come several key questions in the field. These include finding the best ways to ensure education, employment and psychosocial development (Adams-Graves *et al.*, 2007; Bemrich-Stolz *et al.*, 2016; Panepinto & Bonner., 2012; Treadwell *et al.*, 2014; Wonkam *et al.*, 2014a) and assist them in coping with the financial and long term social consequences of a chronic illness (Ahmed *et al.*, 2015, Bhagat *et al.*, 2014; Claster & Vichinsky, 2003; Ohaeri & Shokumbi, 2002; Anie *et al.*, 2012), all with the aim of improving HRQL.

HRQL is a multifaceted concept related to how people function in the mental, physical, emotional and social aspects of their lives. HRQL-measures assess the impact health status has on patients' well-being and quality of life (QOL), as reported by patient's themselves (Healthy People 2020). One method of assessing the impact of SCD on patients, examined from both the patient and family perspectives, is by using patient reported outcome (PRO) measures which is recorded as HRQL. To date HRQL in SCD is mainly assessed using generic PRO tools such as WHOQOL-BREF

(Skevington, Lotvy & O'Connell, 2004), SF-36 (Ware & Sherbourne, 1992) and PROMIS® (Cella *et al.*, 2011), as very few SCD-specific PRO tools have been developed.

This said, both generic and SCD-specific PRO tools have highlighted key issues around HRQL in various populations of patients with SCD. These issues include how functional capabilities and HRQL are often impaired due to associated morbidities such as regular pain crises, frequent hospitalization, neurocognitive deficits, stroke and organ failure (Pereira *et al.*, 2013; Mastandréa *et al.*, 2015; McClish *et al.*, 2005). It is also reported that adults with SCD may have lower overall HRQL than that of the general population and it may even be worse when compared with other chronic non-communicable diseases (Bhagat *et al.*, 2014; Mastandréa *et al.*, 2015; Dos Santos & Gomes Neto, 2013; McClish *et al.*, 2005; Treadwell *et al.*, 2014), however not all studies found this (Adams-Graves *et al.*, 2007).

In a Brazilian study comparing patients with SCD that have different genotypes and therefore different expected disease severity, Pereira *et al* (2013) showed that when factors such as regular pain crises, blood transfusions and need for hospitalisation are compounded with unemployment and financial implications and poor access to healthcare, overall influences of SCD on HRQL were significantly more negative, regardless of genotype. Participants in a Ghanaian study by Adzika *et al* (2017) generally reported to be dissatisfied with their HRQL within domains of health, self-esteem, goals and values and financial aspects. Dampier *et al* (2011) showed that in those with SCD overall QOL scores were decreased when compared to the general population in the USA, with certain SCD-related complications such as asthma, vaso-occlusion and avascular necrosis contributing more to decreased QOL.

In the USA, when comparing SCD to other chronic conditions, McClish *et al* (2005) showed how when compared to cystic fibrosis, patients with SCD had worse scores in all QOL domains except for mental health. Compared with asthma and chronic haemodialysis patients, adults with SCD had worse QOL with regards to vitality, physical pain and general health. In an Indian cohort, Bhagat *et al* (2014) found that when compared to patients with congenital heart disease, nephrotic syndrome and juvenile diabetes that those with SCD had poorer overall HRQL, with higher pain scores and lower physical functioning and emotional domains. Social functioning scores were lower in SCD but not statistically significant.

In a study by Adams-Graves *et al* (2007) they did not report a significant difference in overall HRQL between patients with SCD and those with rheumatoid arthritis (RA), except in social and physical domains in which individuals with SCD had higher scores. This study did not compare

those with chronic disease to healthy controls, but interestingly found that SCD adults that were married or living with a partner had higher HRQL scores, although Adzika *et al* (2017) did not find this. They also found that in general older patients had higher scores in the physical domains, likely due to not being as active, therefore not feeling so hampered by their condition (Adams-Graves *et al.*, 2007), however a difference in age groups was not found by Ahmed *et al* (2015), and the opposite was reported in a study by Dampier *et al* (2011) whereby increasing age lead to lower QOL scores in all domains except mental health. Ahmed *et al* (2015) also reported that those with tertiary education and those who exercised showed to have higher HRQL scores in various domains, including physical and emotional functioning and vitality, versus those who did not.

### **Psychosocial challenges in SCD**

Overall SCD has mainly been reported to negatively impact on all domains of QOL, including physical, social, emotional and mental functioning, although data on impact on individual domains differs between certain studies. The specific psychosocial challenges that lead to impaired HRQL domains however need addressing. Previous studies have shown that these psychosocial challenges include pain, psychological distress, barriers to accessing quality healthcare and decreased education and employment opportunities and abilities. Further factors reported to impact patients' psychosocial well-being include economic circumstances, impact on family and social functioning and health-related stigma and discrimination (Anderson & Asnani, 2013; Keller *et al.*, 2014; Panepinto & Bonner, 2012; Thomas & Taylor, 2002; Treadwell *et al.*, 2014).

Pain in SCD is the most common complication experienced by patients (Adzika *et al.*, 2017; Ballas, 2007; Williams & Tanabe, 2016) with its effects often dominating perceptions of all domains of HRQL (Booker *et al.*, 2006; McClish *et al.*, 2005; Smith *et al.*, 2005). Onset of pain crises are often hard to predict, making coping with and treating them extremely hard. Pain and its effects vary between individuals but commonly have been seen to be very draining on individuals, affecting ability to achieve at university or in the workplace. Chronic pain can affect one's ability to eat, be physically active and lead a normal social life. Pain has also been seen to affect how positively one perceives their future and so may contribute to feelings of anxiety, fear and depression in certain individuals (Booker *et al.*, 2006; Fuggle *et al.*, 1996; Mann-Jiles & Morris, 2009; Thomas & Taylor, 2002; Williams & Tanabe, 2016). This is further supported by the fact that mood and overall perceptions of HRQL improved with reduced amounts of pain (Anie *et al.*, 2012).

In a comprehensive review by Treadwell *et al* (2014) they noted that only around half of the studies looking at pain in SCD used comparison groups. However, despite reservations in relation to the methodology, results across studies suggested that there was a relationship between pain and

negative impact on patients' psychosocial well-being. The first large scale study looking at pain in SCD adult patients was the Pain in Sickle Cell Epidemiology Study (PiSCES) and they showed that severe, acute pain episodes are still a significant feature of SCD and that severity and amount of pain may be greatly undervalued (McClish *et al.*, 2005).

Evaluation of psychological well-being in chronic disease showed that people living with chronic diseases are seen to have an up to three-fold increased risk to develop mental disorders (Katon, 2011; Turner, 2000). Seigel *et al* (1990) showed that those with chronic disease have decreased self-esteem and increased depression compared to controls. In SCD, depression and anxiety levels have been seen in certain studies to be higher when compared to the general population (Adewoyin, 2015; Treadwell *et al.*, 2014). Udofia & Oseikhuemen (1996) showed that the prevalence of psychiatric morbidity in SCD was three-fold greater when compared to control groups. Patients with SCD often had poorer self-esteem and increased feelings of being inferior and inadequate, especially in a social and family context (Ohaeri *et al.*, 1995). Psychological disorders seen in patients with SCD were mainly due to having to leave school earlier than peers and issues with adjusting to social circumstances. Some patients were also seen to have impaired cognitive function which contributed to psychiatric disturbances (Hilton *et al.*, 1997). Unsurprisingly the psychological consequences of living with SCD into adulthood are often seen to negatively impact patients' lives. However, this wasn't always found to be the case with Laurence, George & Woods (2006), Leavell & Ford (1983) and McClish *et al* (2005) not reporting a statistically significant difference in mental health scores or psychiatric involvement in individuals with SCD versus controls.

In SCD, family and social functioning is often affected, with patients facing health-related discrimination and stigmatisation. Within personal and social relationships those with SCD have reported isolation and loneliness resulting in avoidance of disclosure of disease status to the public (Anie *et al.*, 2012; Thompson *et al.*, 1992). Disease status also puts patients at risk for discrimination at work (Atkin & Ahmad, 2001) and around medical cover further warranting avoidance of status disclosure (Kass *et al.*, 2004). Treadwell *et al* (2015) also found having SCD or being a SCT carrier prevented certain marriages and strained current marriages if affected children were born to couples.

Frequent hospitalisation and absenteeism can put strain on personal or professional relationships within the academic or work environment. Strickland *et al* (2001), Thomas & Taylor (2002) & Treadwell *et al* (2015) demonstrated how the nature of SCD can make securing employment

difficult which impacts economic circumstances and increases psychological stressors, impacting personal relationships.

Due to the significant psychosocial impact SCD can have, patients often find ways to try and cope with their condition. Coping mechanisms include seeking medical treatment, limiting physical activity, distraction, denial, seeking social and spiritual support and making mental adjustments (Adzika *et al.*, 2017; Anderson & Asnani, 2013; Atkin & Ahmad, 2001). In a study by Wonkam *et al.* (2014b) in Cameroon it was seen that a large proportion of the participants had moderate to severe difficulty with coping that could be attributed to poor quality of care, lack of adequate medical resources and medical socio-economic support. For this reason, it is thought that ability to cope may also be correlated with available resources rather than just with a person's state of mind or disease severity, and this was further supported by results from a British study by Atkin & Ahmad (2001). Within a Brazilian cohort, Dos Santos & Gomes Neto (2013) and Pereira *et al.* (2013) demonstrated how SCD impairs ability to work, resulting in lower income, increased stress and poorer HRQL, supporting how socio-economic circumstances of affected individuals could directly influence resources and therefore one aspect of coping (Atkin & Ahmad, 2001).

It is interesting to note that issues around HRQL in SCD could be compared, to some extent, between Brazil (Dos Santos & Gomes Neto, 2013; Mastandréa *et al.*, 2015; Pereira *et al.*, 2013; Vilela *et al.*, 2012) and some African countries (Pule *et al.*, 2017; Wonkam *et al.*, 2013; Wonkam *et al.*, 2014a; Wonkam *et al.*, 2014b), all of which are low to middle-income countries. However, differing from Brazilian medical programmes, a comprehensive programme of new-born screening for SCD (Brandelise *et al.*, 2004) is seldom reported in Africa, of which can have significant negative effects on patients' well-being and HRQL (Grosse *et al.*, 2011).

Research suggests that living with SCD comes with a variety of additional psychosocial stressors, many of which can negatively impact perceived HRQL (Wilkie *et al.*, 2010). However, studies have also reported positive aspects to living with SCD. A study conducted by Treadwell *et al.* (2015) within a Ghanaian population suggested that living with SCD was associated with resilience and an ability to achieve even amidst adversity. SCD was thought to unite families.

Currently management for SCD relies mainly on treating or managing the physical symptoms and medical complications associated with the condition (Knowlton *et al.*, 2015) but there is increasing evidence to suggest that patients require increased psychosocial management and support. A more holistic approach to caring for patients with SCD is needed to improve biological functioning and perceptions of HRQL in patients (Wilkie *et al.*, 2010).

For this reason, there is a great need for healthcare professionals to understand how significantly the psychosocial consequences of SCD can impact HRQL in affected individuals and use this information to guide the development of more adequate and easily accessible patient-centred medical treatment programmes, including therapeutic, counselling and support options (Ohaeri *et al.*, 1995; Panepinto & Bonner, 2012; Price *et al.*, 2014; Treadwell *et al.*, 2014; Treadwell *et al.*, 2015). Healthcare professional may underestimate the impact the disease has on HRQL and this can lead to them being dismissive or judgemental of their patients. It is therefore imperative that measures be put into place to measure HRQL among adults with SCD to better the attention given to patients' perceptions of health outcomes and disease severity (Ahmed *et al.*, 2015). This said, the cross-cultural applicability of available HRQL instruments and PRO measures and evaluations of health beliefs and social stigma, have not been studied in Africa. These studies are necessary to advance their use in monitoring the health of children and adults with SCD, as interventions are implemented, to address the clinical and psychosocial complications of SCD, and to address stigmatisation.

There is also a need to advance scientific knowledge in SSA by contributing to the development and application of PRO instruments such as the Patient Reported Outcomes Measurement Information System (PROMIS®; Ader, 2007). PROMIS® is an National Institute of Health Common Fund initiative that utilises rigorous methodology for measurement development and evaluation of the validity of each measure. A multi-cultural perspective was incorporated into PROMIS® measure development from the outset, with each item undergoing a systematic evaluation of “translatability and cultural harmonization” (Keller & Correia, 2012). The goal of PROMIS® has been to create measures to describe health experiences and the effectiveness of health interventions from the patients' perspectives, focusing on health concepts such as pain, and social and emotional functioning. Standardised PROMIS® measures have been successfully translated into multiple languages and evaluated for adaptability across cultures in 16 countries, but none in Africa. There is need to provide a unified measure for reporting of psychosocial burden and HRQL associated with SCD in SSA, to enhance patient-centred research, clinical trials reporting and population monitoring across studies and settings (Alonso *et al.*, 2013).

### **1.2.6 Management in SCD**

Since SCD is a multisystem disease, management entails many components. These components include preventing complications, managing complications when they arise, providing educational and psychosocial support and potentially curing affected individuals. Those with SCD require a comprehensive healthcare management programme involving regular clinical follow ups (Wang *et*

*al.*, 2011; Yawn *et al.*, 2014) with a multi-specialist team including haematologists, orthopaedic surgeons, ophthalmologists, nephrologist and other organ specialists. Patients also ideally require care from specialised nurses, genetic counsellors, mental healthcare professionals and social workers (Adewoyin, 2015; Makani *et al.*, 2013).

In terms of medical interventions, blood transfusions (BT) are used to control decreases in haemoglobin levels caused by haemolytic anaemia in some patients. Acute anaemic crises can be life threatening and BT may be essential in these situations. BT are also highly indicated in patients who have suffered strokes, those undergoing surgery and in pregnancy, with long term BT therapy indicated in patients with cerebrovascular disease (Makani *et al.*, 2013). Currently the only disease modifying therapy available for use in SCD is hydroxyurea, a cytotoxic medication with the ability to boost HbF levels in certain patients (Ribeil *et al.*, 2017). Studies have shown hydroxyurea decreases frequency of pain crises (Charace *et al.*, 1995), rates of hospitalisation, need for blood transfusion, and increases survival rates, with improved prognosis for patients (Aliyu *et al.*, 2008; Fitzhugh *et al.*, 2015; Steinberg *et al.*, 2003; Steinberg, 2005). Since pain and other mentioned comorbidities can significantly impact adult functioning and well-being, prevention or reduction using therapies such as hydroxyurea may prove valuable in improving patients HRQL (Ballas *et al.*, 2006). Results from a Multicenter Study of Hydroxyurea in SCA Trial showed that patients who responded well to hydroxyurea therapy showed improvement in various QOL domains, including remembering pain episodes, social functioning and overall general perceptions of HRQL. Most individuals with SCD in SSA are not on hydroxyurea indicating an opportunity for implementing this drug with the aim of improving HRQL (Aliyu *et al.*, 2008).

Managing acute pain in SCD is a fundamental aspect in the care of patients, however it is often not efficiently addressed within all healthcare settings (National Heart Lung and Blood Institute, 2014). This indicates the need for healthcare professionals to examine efficacy of health interventions to reduce pain and improve HRQL. There is a need for proper education of patients regarding the nature of the disease and possible complications along with prevention and management options. Patients also need counselling regarding adherence to medical care. This can help patients cope more effectively out of hospital and may also reduce the burden of patient influx and healthcare costs associated with SCD (Adewoyin, 2015).

Patients don't only require medical intervention but require psychosocial support as well. They need counselling and education regarding reproductive risks, pre-marital screening options and reproductive options (Aneke & Okocha, 2016; Patik *et al.*, 2006; Yawn *et al.*, 2014). These educational messages are best passed on through treating physicians and genetic counsellors

whereby patients' additional psychosocial needs can also be assessed and addressed, and mental health or social worker referrals made where appropriate. It is important to provide psychosocial support to patients to improve HRQL (Adewoyin, 2015). Improving patient's HRQL is an important goal of medical care and involves enhancing the overall outcomes of treatment to bring back a sense of well-being to patients' lives. This said, improving HRQL in patients with chronic diseases, such as SCD, can prove challenging due to the disease course itself (Ballas *et al.*, 2006).

Ultimately the goal for those with SCD is a cure. The only currently successfully proven cure for severe SCD is allogeneic hematopoietic stem-cell transplantation (HSCT), however this is only available to limited numbers of patients as less than 18% have access to a matched sibling donor (Ribeil *et al.*, 2017). As explained by the haematologists at Groote Schuur Hospital, HSCT is not offered to adults with SCD in their healthcare services due to lack of funding and risk of severe toxicities and death (Joubert, personal communication 2016). Another promising cure is *ex vivo* autologous hematopoietic stem cell gene therapy. This may provide a potential long-term cure for SCD, and recent clinical trials have shown it to be successful in a single SCA patient however data on long-term success in humans is limited (Ribeil *et al.*, 2017).

In an African setting, this new treatment is currently out of reach for most patients due to huge financial implications and inadequate infrastructure (Aneke & Okocha, 2016). There is therefore a need to find alternative, more accessible and cost-effective ways to treat and manage patients' health and well-being with the aim of improving HRQL.

### **1.2.7 Genetic services in South Africa and the importance of genetic counselling in SCD**

#### **Genetic services in South Africa**

The foundations for the field of medical genetics in South Africa were laid at the end of the 1960's whereby the understanding of genetics and its basis of disease was being recognised as a crucial part of medical healthcare. Educational programmes were subsequently put in place and routine genetic clinics were started at Groote Schuur Hospital and RCWMCH. These clinics served to provide patients with diagnoses, prognostic information, management options and genetic counselling services (Beighton *et al.*, 2012). Research initiatives during this time were also set up with the aim of establishing data on the presence and frequency of various genetic conditions amongst the varied population groups of South Africa (Beighton, 1976).

Currently, genetic research and developments in Africa continue to expand with growing support from national and international funders and collaborators (Pepper, 2011). The field of medical genetics also maintains excellent clinical teaching and training programmes, including the genetic

counselling programme which was established in 1988 (Kromberg, Wessels & Krausse, 2013). This said, genetic services in South Africa are still limited with comprehensive services available in only three of the main urban centres. The national shortage of trained medical genetics professionals and vacant posts means that a large proportion of the population will not have access to much needed services (Beighton *et al.*, 2012).

Genetic counselling is still a relatively young profession in South Africa (Pina-Neto, 2008). Genetic counsellors serve to assist affected or at-risk individuals within families in understanding the medical facts related to various genetic disorders, the likely course of the disorder and what management options, including psychosocial support, are available to them. Genetic counselling also aims to provide occurrence and recurrence risks which ultimately will guide the course of action affected or at-risk individuals may take. Being non-directive and non-judgemental whilst maintaining the autonomy of the patients' decisions is the main goal in the process (Biesecker, 2001).

### **The importance of genetic counselling in SCD**

As mentioned previously, SCD is a huge health burden globally, particularly in SSA, and is associated with high morbidity and mortality and reduced HRQL. It is therefore crucial that measures be put into place to reduce prevalence worldwide. Genetic counselling for those affected by SCD or at risk to have affected children allows for these individuals to be educated on the condition, to learn their reproductive risks and to ultimately make informed decisions around marriage and reproduction (Aneke & Okocha, 2016; Modell & Darlison, 2008). SCD counselling is also important to help young adults deal with misconceptions about their condition and the psychosocial implications that come with living with a chronic hereditary disease (Headings & Fielding, 1972).

When it comes to counselling and testing for at risk individuals it is important that there is a close link between the testing and counselling process. Lack of counselling during this process can result in unnecessary anxiety, misconceptions about the condition and inheritance as well as impaired self-image for the patient. Genetic counsellors or medical geneticists are ideally placed to put the entirety of SCD and its associated problems and risks into proper perspective for the patients, their families and/or partners, although this can be achieved by most appropriately trained healthcare professionals (Headings & Fielding, 1972).

Interventions shown to reduce SCD prevalence include premarital counselling and prenatal diagnosis for those at high-risk of having affected children (Aneke & Okocha, 2016). Premarital

counselling offers an advantage over neonatal screening as it is a primary prevention method and can prevent the births of affected individuals. For this reason, certain countries, such as Saudi Arabia, Egypt & Morocco, have successfully established premarital counselling and testing programmes with the aim to reduce affected births (Alswaidi & O'Brien, 2009; Memish & Saeedi, 2011). Prenatal diagnosis for at risk pregnancies is also one way of detecting disease status of foetuses and with termination of affected pregnancies can serve as one way to reduce the prevalence of SCD. Africa however, where SCD carrier rate and burden is high, fails to offer such programmes as standard care to patients or at-risk population members (Alswaidi & O'Brien, 2009).

Studies that explore how genetic counselling services can improve HRQL in patients with chronic genetic conditions, such as hereditary cancers, have shown that interventions that aim to explore and improve self-efficacy are important to improve both mental and physical aspects of HRQL. Social and self-esteem support is also seen to be crucial in helping patients cope with chronic conditions. Social support should not only come from patients' personal relationships but should also be given by health care providers, such as genetic counsellors. This helps to further enhance patients' ability to adapt, not only to the health-related issues but negative psychosocial aspects too. Offering counselling support as part of the medical care of such patients is therefore crucial to help manage stress and coping and its effects on health and HRQL (Carlsson *et al.*, 2004; Haugland, Wahl, Hofoss & DeVon, 2016).

This said, it is imperative that patients with SCD receive such services with the aim of improving self-efficacy by helping them utilise their own resources and personal strengths and by making support options available (Biesecker, 2005) to improve HRQL. Considering there is already a notable increase in SCD prevalence in South Africa, in Cape Town Groote Schuur Hospital and RCWMH offering tailored medical services and weekly genetic counselling services to all patients (Alli *et al.*, 2014; Pule *et al.*, 2017; Wonkam *et al.*, 2012), with Tygerberg Hospital also providing monthly services. New Somerset Hospital, in Cape Town, also offers services to patients with SCD and has recently requested genetic counselling services whereby genetic counsellors attend clinics bimonthly. Creating these services is an important step for South Africa as without these services, tailored towards patient education and psychosocial needs, medical care as a whole can't be used to its fullest potential (Vavaseur, 1977).

### **1.3 Rationale for study**

To date, most of the research exploring HRQL and psychosocial impact of SCD in adult patients has been conducted in the USA and the UK (Ahmed *et al.*, 2015; Mann-Jiles & Morris, 2009;

Treadwell *et al.*, 2014). Very little SCD HRQL research has been carried out in Africa, where SCD prevalence is highest, (Wonkam *et al.*, 2014a) indicating a huge unmet need. For this reason, there is an urgent need for this research to be conducted in an African healthcare setting. To the best of our knowledge no study has been conducted in South Africa to document perceptions of HRQL in adults living with SCD.

This said, much of the current research uses validated PRO instruments to explore HRQL in individuals with SCD (Adams-Graves *et al.*, 2007; Asnani, Lipps & Reid, 2009; Treadwell *et al.*, 2014). To date there are no SCD-specific PRO instruments that have been adapted to and validated in Africa, where SCD has the highest prevalence. Due to specific psychosocial, counselling and health system challenges associated with SCD in the African environment, as reported in Ghana (Treadwell *et al.*, 2015) Cameroon (Wonkam *et al.*, 2014b), Nigeria (Brown, 2010) and South Africa (Wonkam *et al.*, 2012), it is important to qualitatively explore potential issues regarding impact of SCD on African patients before existing quantitative PRO tools can be adapted and implemented in this population.

Exploring issues around HRQL in adults with SCD will also assist healthcare professionals in better understanding of their patients' physical and psychosocial needs and allow for a more holistic approach to medical care to be provided, with the aim of improving overall HRQL.

### **1.3.1 Aims of the study**

This research study aims to qualitatively explore how adults with SCD, attending Groote Schuur Hospital in Cape Town, perceive their HRQL to be. This will allow for healthcare professionals to provide more tailored medical treatment and therapeutic, genetic counselling and support options relevant to their patients.

### **1.3.2 Objectives of this study**

- 1) To recruit a selected group of adult participants, from Groote Schuur Hospital, living with SCD and to conduct face-to-face interviews with these participants to explore their perceptions of how they feel their health has affected their QOL.
- 2) To qualitatively analyse the data looking for emerging themes regarding HRQL of adult individuals with SCD.
- 3) To qualitatively explore potential issues regarding the impact of SCD on African patients to
  - i) Be able to tailor genetic counselling services to the needs of patients and
  - ii) to understand

the impact of SCD from a qualitative aspect as to assist in the future development of quantitative PRO tools that can be adapted and implemented in African healthcare settings.

## **1.4 Chapter summary**

In chapter one the literature was reviewed and gaps in the knowledge identified allowing for the aims and objectives of the study to be laid out. The next chapter will cover the methods employed in this research study.

## **CHAPTER 2: RESEARCH METHODOLOGY**

### **2.1 Chapter Overview**

This chapter describes the methods used in this study. It also discusses the relevance and appropriateness of using qualitative research methods in genetic counselling and the details of the recruitment process, data collection and analysis methods. The validity and reliability of the study as well as ethical considerations are also discussed.

### **2.2 Research Design**

#### **2.2.1 Rationale for employing qualitative research**

This study was designed as an in-depth qualitative study, an appropriate methodology for several reasons. Firstly, qualitative research is mainly concerned with understanding people's experiences from a human-centred approach (Jackson, Drummond & Camara, 2007), and because it focuses on studying people's experiences, events and facts based on social reality it helps to answer questions about how society works and to raise potential questions that could change our perceptions of society (Neuman, 2014). Ultimately qualitative research intends to find novel ways to understand people's dynamic lived experiences (Jackson, Drummond & Camara, 2007) and when used to explore patients' experience of the psychosocial impact of disease can be valuable in understanding QOL (Thomas & Taylor, 2002). For this reason, this type of research is important to help us apply knowledge obtained in relevant fields such as counselling (Neuman, 2014).

Secondly, in genetic counselling, qualitative studies are encouraged as genetic counselling itself involves interactions around sensitive, complex subjects. The skills needed to conduct interviews in qualitative research are similar to the skills acquired when training to provide counselling to patients. During preparation, presentation and follow-up of patients' cases, one also develops other skills such as the ability to evaluate and integrate information more efficiently. This type of skill

development can prove invaluable for critically integrating and evaluating qualitative data (MacFarlane, Veach & LeRoy, 2014).

## **2.3 Study site, population and sample**

### **2.3.1 Study site**

Groote Schuur Hospital is the primary healthcare facility attending to medical needs of adults living with SCD in Cape Town. There are weekly SCD clinics held at Groote Schuur Hospital haematology clinic, on Wednesdays. Pule *et al* (2017) reviewed all patient folders at the haematology clinic, between 1996 and 2016, and noted that there are 81 patients with SCD on record, 61 of whom have migrated from other SSA countries outside of South Africa. They also recorded that 58 patients are regular clinic attenders, with most attending monthly follow ups and other more stable patients coming every three months.

### **2.3.2 Study population**

Participants for this research study were recruited from the haematology SCD clinic at Groote Schuur Hospital. A purposive sample of adult participants attending this clinic were enrolled in this study between the period from July 2016 to February 2017. Patients had to be over 18 years of age at the time of recruitment and affected with SCD. The haematologist running the clinic assisted in checking patient files to ensure a diagnosis of SCD. Only English-speaking adult participants were recruited for this study. The reason for choosing English speaking participants is that most patients attending the SCD clinic at Groote Schuur Hospital are immigrants from SSA with most them having French as their mother tongue (Pule *et al.*, 2017). Finding translation support for a non-official South African language may prove challenging and is out of the scope of this minor dissertation. Having spoken to the doctor in charge of the Groote Schuur Hospital SCD clinic, it has been determined that the majority of patients can speak English and this reduces the chance of introducing potential bias.

### **2.3.3 Sampling method and sample size**

#### **Sampling method**

The sampling method used in this study was purposive sampling. In purposive sampling, the sample units are selected because they have specific characteristics that allow for detailed investigation and understanding of core themes the researcher intends to explore. In this type of sampling method samples are purposefully chosen with the aim of ensuring all essential factors relevant to the research topic are covered. This method also aims to ensure that there is diversity within the

essential criteria to allow for exploration of the impact of the characteristic under study (Luborsky & Rubinstein, 2011; Spencer, Ritchie & O' Connor, 2003). For this reason, only participants meeting eligibility criteria were purposefully selected.

### **Sample size**

In qualitative research the researcher aims to gather in-depth data rather than large amounts of data, often seen in quantitative studies (Marshall, 1996). Before initiation of this study 15-20 participants were proposed to be recruited from an already established database of 81 patients. This sample size was continuously assessed as the main goal within the research design is to reach data saturation. Data saturation is defined as the point at which others are able to replicate the study and no new data, no new themes and no new coding emerges from the data (Fusch & Ness, 2015). Data saturation is the key stopping component in qualitative research (Bemrich-Stolz *et al.*, 2016). In this study, it was established that the 18 recruited participants provided data sufficient to reach saturation.

### **2.4 Data collection**

Prior to the interview, willing participants were given a research study information sheet and asked to sign consent (see Appendix A). After consenting, a short socio-demographic form (Appendix B) was given to the participants to complete.

After collecting this information, a face-to-face interview was conducted by myself, the researcher, using an open-ended interview guide (Appendix C). The interview questions were designed using previous literature and aimed to explore physical and psychological functioning, pain and its impact and social impacts such as education, employment opportunities and discrimination. Access and satisfaction with healthcare, coping strategies, burden of treatment and independent living skills were also aimed at being explored (Hays, Sherbourne & Mazel, 1993; Marsh, Kamuya & Molyneux, 2011; Treadwell *et al.*, 2014; Zempsky *et al.*, 2013). The main interview questions were designed to ensure all major areas of the research were covered, the follow-up questions and probes allowed for further explanations and clarification of themes and concepts (Rubin & Rubin, 2011). Test interviews were conducted prior to data collection to assess potential weaknesses or limitations within the interview guides (Spencer, Ritchie & O'Connor, 2003) and questions adjusted accordingly.

The interviews were conducted on the same day as the adult SCD clinic as to avoid unnecessary travelling for participants. Interviews were administered and audio recorded by me, the researcher, and took approximately 30-45 minutes. Interviews took place in a quiet room as to avoid distraction

and to allow participants to feel comfortable in sharing their experiences. This method of administering open-ended interviews allows for patients voices to be heard and for exploration of complex situations, behaviours, interactions and underlying social and contextual issues (Atkin & Ahmad, 2001; Richards & Morse, 2012).

## **2.5 Data analysis**

The recorded interviews were transcribed verbatim using transcription software (developed by Pietrelli & Baini). Participants names and other identifiable information was removed from the transcriptions as to maintain participant confidentiality. Participants were assigned an alphanumeric code (eg P1, P2 etc) as to allow the researcher to make mention of findings relevant to them without breach of confidentiality. All voice recordings, transcriptions and other documents relevant to this study were kept locked away or on a password-protected computer. After each interview, brief field notes were taken to allow the researcher to capture any observations or influencing factors that may affect interpretation of the data.

Once interviews had been transcribed the framework approach described below, was used to meticulously examine the data and to identify and develop underlying codes. These codes were then entered into NVivo11 (QSR International) software. Nvivo11 software was used as it supports qualitative research and is designed to assist in organising and managing qualitative data. The developed codes were validated by allowing a separate author to independently code 3 transcriptions and the findings were compared to look for consistency. Differences amongst codes were discussed with a further author and subsequently resolved. This method of validation helped to remove any subjective or biased views on emerging data (Baskerville *et al.*, 2016).

Once transcriptions were coded, a thematic content analysis was used to merge codes into major themes and subthemes relevant to the research question. A thematic content analysis allows for qualitative data to be presented descriptively (Anderson, 2007). During the coding process meetings were regularly held between the researcher and co-supervisors to further refine the emerging themes and subthemes and to ensure participant responses were grouped according to appropriate themes that emerged from the data. Data saturation occurred after analysis of the 16<sup>th</sup> transcription but the remaining two were analysed to further validate saturation (Baskerville *et al.*, 2016).

The framework approach was used as it provides clear steps to follow allowing for the output of concisely organized summarised data. This approach is also commonly used in thematic analysis of semi-structured interview transcriptions as it is a methodical, systematic and comprehensive but is still a flexible tool allowing for the generation of themes in many qualitative approaches (Gale *et*

*al.*, 2013). The framework approach is also flexible in that the researcher can either first collect all data then analyse it or analyse whilst collecting data (Srivastava & Thomson, 2009). The framework approach lays out a five-step process for the researcher to work through when analysis the data. These five steps involve familiarisation, identifying a thematic framework, indexing, charting and mapping and interpreting data (Ritchie & Spencer, 1994).

Familiarisation with the collected data is where the researcher allows themselves to become familiar with their data and gain a general insight into their data (Bryman & Burgess, 2002; Ritchie & Spencer, 1994). Transcribing the audio-recordings oneself and reading over transcriptions will allow one to establish the main ideas and themes emerging from the data and record them (Srivastava & Thomson, 2009). The second step involves identifying a thematic framework whereby the previously identified themes are examined and chosen to be used as the base of the thematic framework. The themes forming the basis of the framework can be used to sift through and classify the remaining data, whilst keeping an open mind (Bryman & Burgess, 2002; Ritchie & Spencer, 1994).

Indexing is the step in which a data management software tool could be useful as it requires that the researcher now identifies sections of the data agreeing with a relevant theme. Charting is the step in which the indexed portions of the data are arranged underneath the headings for the identified themes and subthemes. It is important to remember to keep the data in a contextual order as to easily understand its origin and context when going back to it. The last step of mapping and interpreting the data involves analysis of the main characteristics of the data under each theme and subtheme. This analysis stage should allow the researcher to interpret the data set in a meaningful way (Bryman & Burgess, 2002; Ritchie & Spencer, 1994).

## **2.6 Validity and reliability of the research study**

In qualitative research validity refers to whether the researcher measures what was intended and how reliable the interpretations of the data are (Spencer, Ritchie & O'Connor, 2003). To ensure validity the researcher firstly needs to pay attention to how the research question, data and methods fit as this will help in ensuring the data is relevant, appropriately handled and research question correctly addressed. Secondly the researcher needs to accurately document each step in the analysis process to be accountable for the research outcomes (Richards & Morse, 2006; Spencer, Ritchie & O'Connor, 2003). A step taken in this study to remove researcher bias and ensure validity included that three of the interviews were individually examined by co-supervisors where they could create

their own codes. These codes were then discussed to ensure that the researcher had accurately interpreted the data.

Reliability in qualitative research refers to the reproducibility of the study, ie how far a research design can lead to the same results. Reliability also refers to how consistently data is interpreted within the context of the research question (Flick, 2009). Using the framework approach in this study allowed for detailed description of the data analysis process and therefore allows for reproducibility of this study. Further steps to ensure reliability in this study included allowing one person to conduct and analyse interviews, whilst still checking with co-supervisors for consistency of coding through the data analysis phase (Richards & Morse, 2006).

## **2.7 Ethical considerations (HREC REF: 370/2016)**

The declaration of Helsinki notes that the essential principles for medical research involving human subjects is respect for the individual, the individual's right to autonomy and their right to make informed decisions with regards to participating in the research. These principles apply both at the start of the study and throughout the course of the research. The researcher must always be mindful that the subject's well-being must always take priority over the interests of science and society and that ethical considerations are always priority over various laws and regulations (World Medical Association, 2001).

### **2.7.1 Consent**

Potential participants invited to be involved, were informed that the study objective was to see how adults, in Cape Town, affected with SCD perceive their QOL. They were further informed that their involvement was completely voluntary and that they could withdraw from the study at any given time. They were informed that the interviews would take place in a private setting at the adult SCD clinics at Groote Schuur Hospital and would take approximately 30-45 minutes. They were also informed that the interview would be administered in English and would be audio-recorded. All consenting participants were required to sign consent forms to participate in the study. The information and consent form can be found in Appendix C. A copy of this form was given to all participants to keep. It contained contact details for myself, my supervisor and the head of the human research ethics committee in case they wanted to contact one of us with further questions or to lay complaints.

### **2.7.2 Privacy and Confidentiality**

The participants were informed that the interviews would be audio recorded and transcribed by the researcher. They were informed that their names or identifying information would be assigned a code and would not appear in the data and that only the researcher would have access to this information. They were also informed that all audio and written data generated during the research process would be locked away in a cupboard or stored on a password-protected computer within the human genetics division at the University of Cape Town.

The participants were informed that the data would only be available to the researcher, supervisors and examiners involved in the study. They were also informed that all information collected would remain confidential and would be used for research purposes only with all personal information remaining anonymous when the data is published.

### **2.7.3 Risks and benefits to participants**

No risks were foreseen for the participant's involvement in answering the interview. If the participant at any point during the interview was uncomfortable or if any questions evoked an emotional response they had the choice to not answer certain questions, withdraw from the process and/or seek counselling from a genetic counsellor. Participants were also informed that if they chose to not participate or withdraw from the study that their decision would not in any way affect the healthcare services they currently receive at Groote Schuur Hospital.

Benefits to participants were that they got to share their story allowing them to more effectively make sense of their world (Bailey & Tilley, 2002). Story telling has also seen to be therapeutic to patients and allows for marginalized groups to be heard (Koch, 1998). The information received through the interview process will also help improve our understanding of the impact of SCD on HRQL in these patients. This is important for healthcare professionals, including genetic counsellors, to objectively assess the efficiency of various psychosocial and medical interventions as well as the outcomes of specific medical and therapeutic interventions (Ohaeri *et al.*, 1995; Panepinto & Bonner, 2012; Price *et al.*, 2014; Treadwell *et al.*, 2014).

## **2.8 Chapter summary**

Chapter two discussed the research methodology employed in this study. The reasoning for method choice is addressed along with ethical considerations. The next chapter will contain research results and a subsequent discussions around findings.

## **CHAPTER 3: RESULTS & DISCUSSION**

### **3.1 Chapter Overview**

This chapter will discuss how the research objectives were achieved and present the socio-demographic information of each participant. Themes generated from the research data around how participants perceived their health to affect their overall well-being and functioning and therefore their HRQL will be presented and discussed using quotations from the interviews to further support the findings.

### **3.2 Achieving research objectives**

After consenting eligible study participants, face-to-face interviews were conducted with these participants. These interviews allowed the researcher to 1) explore the perceptions of how participants feel their health has affected their QOL and therefore reach the first study objective; 2) qualitatively determine potential issues regarding the impact of SCD on African patients, allowing the second and third research objectives to be reached. The fourth research objective was to determine how genetic counselling services may be tailored to needs of patients with SCD, and was achieved throughout the data analysis process. The data gathered from the interviews can ultimately guide healthcare professionals, including genetic counsellors, to better understand the psychosocial needs of patients to allow for a more rounded approach to medical care to be implemented for them.

Over a period of 5 months, twenty eligible participants were selected for participation in the study. Of the twenty, 18 consented to take part giving a response rate of 90%. The reasons for 2/20 (10%) eligible participants not agreeing to participate included i) patient did not want to be recorded and ii) a language barrier did not allow for the patient to fully understand what it was the researcher was asking and informed consent was therefore not possible.

### **3.3 Socio-demographic data of research participants**

Of the 18 participants five are from SA indicating that a majority (n=13) migrated to SA from other African countries. Of the 13 migrants, most (n=6) migrated from the Democratic Republic of Congo (DRC), followed by Nigeria (n=3), Zimbabwe (n=2), Rwanda (n=1) and Kenya (n=1). Nine participants (50%) were female and nine (50%) were male. The age of the participants ranged from 19 – 53 years with the mean age (SD) of the participants being 25.8 (8.3) years. All (n=5) participants from South Africa self-identified as “coloured” and all (n=13) migrant participants self-identified as black African.

Only four participants had completed tertiary education with the remainder (n=14) having completed high school. Five participants were employed at time of recruitment indicating that a majority (n=13) were unemployed. Half of the participants (n=9) were married. Four participants had at least one other person with SCD in their family. Information on marital status and family history was not gathered from the socio-demographic form but was rather asked in the interview and thus is not complete for all participants. A summary of the socio-demographic information for each of the 18 participants can be found in table 2 below.

### **3.4 Clinical profile of participants**

Medical records are recorded in table 3, whereby the genotype of participants is documented. The age of diagnosis, whether they've had blood transfusions at Groote Schuur Hospital, chronic medications and other relevant medical information is recorded. The youngest known age of diagnosis was three months old and the oldest was 35 years. Of those that were diagnosed later in life, this occurred in African countries outside of South Africa and can possibly allude to poorly equipped medical facilities throughout Africa as is discussed in theme 5.

Four of 18 participants had records of the average number of vaso-occlusive painful crises per year. This ranged from one to two crises per year, with one participant reporting having two VOC, weekly. Stroke was reported in one case, and four participants had a cholecystectomy.

Up to 17 of the 18 participants are chronically prescribed hydroxyurea and pain killers. The only participant, not on hydroxyurea, was actively trying to fall pregnant, and was advised against it due to the potential teratogenicity of the therapy. Most participant (n=15) have been or were on Opioid therapy (Tramadol and Morphine) for pain. Ten participants had a record of blood transfusion.

Table 2: Socio-demographic information of research participants

<b>Participant code</b>	<b>Sex</b>	<b>Age (years)</b>	<b>Ethnicity</b>	<b>Home country</b>	<b>Marital status</b>	<b>Highest level of education</b>	<b>Employment status</b>	<b>Family history of SCD</b>
<b>P1</b>	M	22	Black	Nigeria	Single	High School	Unemployed	n/a <sup>§</sup>
<b>P2</b>	F	24	Black	Zimbabwe	Married	High School	Employed	n/a
<b>P3</b>	F	25	Coloured	South Africa	Married	High School	Unemployed	Yes
<b>P4</b>	F	29	Black	Zimbabwe	Single	Tertiary	Employed	No
<b>P5</b>	M	37	Black	Nigeria	Single	High School	Unemployed	Yes
<b>P6</b>	M	27	Coloured	South Africa	Married	Tertiary	Employed	Yes
<b>P7</b>	M	20	Coloured	South Africa	Single	High School	Employed	n/a
<b>P8</b>	F	19	Black	DRC	Single	High School	Unemployed	No
<b>P9</b>	F	20	Coloured	South Africa	Single	High School	Unemployed	Yes
<b>P10</b>	M	25	Black	Ruwanda	Married	High School	Unemployed	Yes
<b>P11</b>	F	20	Black	DRC	Single	High School	Unemployed	n/a
<b>P12</b>	F	28	Coloured	South Africa	Married	High School	Unemployed	n/a
<b>P13</b>	M	31	Black	DRC	Married	Tertiary	Unemployed	n/a
<b>P14</b>	F	25	Black	DRC	Married	High School	Unemployed	n/a
<b>P15</b>	F	20	Black	Kenya	Single	High School	Unemployed	No
<b>P16</b>	M	19	Black	DRC	Single	High School	Unemployed	No
<b>P17</b>	M	21	Black	DRC	Married	High School	Employed	Yes
<b>P18</b>	M	53	Black	Nigeria	Married	Tertiary	Unemployed	Yes

<sup>§</sup>n/a: information did not come up in interview

Table 3: Research participant clinical information

<b>Participant code</b>	<b>Genotype</b>	<b>Age at diagnosis</b>	<b>Blood transfusions</b>	<b>Chronic medications</b>	<b>Other</b>
<b>P1</b>	HbSS	Infancy	NOR*	Hydroxyurea <sup>1</sup> ; Folic Acid; Tramadol <sup>2</sup> ; Paracetamol <sup>3</sup> ; Co-amoxiclav <sup>4</sup>	
<b>P2</b>	HbSS	19 years	Yes; 14 recorded	Hydroxyurea; Folic Acid; Tramadol; Paracetamol; Pneumovac <sup>5</sup>	± 2 crises/yr Scoliosis
<b>P3</b>	HbS/β- Thalassemia	4 years	Yes; 2 recorded	Augmentin <sup>6</sup> ; Folic Acid	Splenectomy
<b>P4</b>	HbSS	3 months	NOR	Hydroxyurea; Morphine <sup>7</sup> ; Tramadol; Paracetamol; Folic Acid; Penicillin <sup>8</sup> ; Vitamin B	
<b>P5</b>	HbSS	35 years	NOR	Hydroxyurea; Folic Acid; Panado <sup>9</sup> ; Tramadol; Morphine; Cetirizine <sup>10</sup>	Chronic Hepatitis B
<b>P6</b>	HbS/β- Thalassemia	6 years	NOR	Hydroxyurea; Morphine; Tramadol; Panado; Folic Acid	± 7-8 crises per year Cholecystectomy
<b>P7</b>	HbSS	4 years	NOR	Hydroxyurea; Morphine; Tramadol; Panado; Folic Acid; Vitamin B; Penicillin	Crisis every 2 weeks
<b>P8</b>	HbSS	3 years	Yes, 2 recorded	Hydroxyurea; Paracetamol; Folic Acid; Vitamin B; Maxolon <sup>11</sup> ; Augmentin	Gallstones ± 2-3 crises per year Cholecystectomy
<b>P9</b>	HbSD	1 year	Yes	Hydroxyurea; Paracetamol; Folic Acid; Vitamin B; Maxolon; Augmentin; Morphine	

<b>P10</b>	HbSS	3 months	Yes, 31 recorded	Hydroxyurea, Exjade <sup>12</sup> , Folic Acid, Panado, Tramadol, Augmentin, Desterol, Vitamin B, Morphine	Ventriculo-Septal Defect; Pulmonary hypertension; Strokes
<b>P11</b>	HbSS	7 years	NOR	Hydroxyurea; Tramadol; Ibuprofen <sup>13</sup> ; Paracetamol; Augmentin; Citrate Sodium <sup>14</sup>	
<b>P12</b>	HbSS	4 months	Yes, 2 recorded	Hydroxyurea; Folic Acid; Panado; Augmentin; Pneumovac; Vitamin B	Gallstones
<b>P13</b>	HbSS	7 years	Yes, 5 recorded (in country of origin)	Hydroxyurea; Tramadol; Panado; Pneumovac; Folic Acid	Cholecystostomy
<b>P14</b>	HbSS	8 years	Yes, 27 recorded	Hydroxyurea; Tramadol; Paracetamol; Cetirizine; Dihydrochloride <sup>15</sup> ; Fluticasone Propionate Aqueous <sup>16</sup> ; Folic Acid; Vitamin B; Metaclopramide <sup>17</sup>	
<b>P15</b>	HbSS	4 years	NOR	Hydroxyurea; Erythromycin <sup>18</sup> ; Hydrocortisone <sup>19</sup> ; Folic Acid; Panado; Prednisone <sup>20</sup> ; Tramadol; Morphine	
<b>P16</b>	HbSS	6 years	NOR	Hydroxyurea; Folic Acid; Panado; Tramadol; Morphine; Vitamin B; Pen-VK <sup>8</sup>	
<b>P17</b>	HbSS	?Infancy	Yes	Hydroxyurea; Folic Acid; Panado; Tramadol; Augmentin	
<b>P18</b>	HbSS	13 years	Yes	Hydroxyurea; Folic Acid; Paracetamol; Panado; Tramadol; Amlodopine <sup>21</sup>	

\*NOR = none on record (ie. no record of blood transfusions was found in the Grootte Schuur Hospital folders)

Trade/ Generic versions of medications: <sup>1</sup>Hydrea; <sup>2</sup>Ultram; <sup>3</sup>Acetaminophen, Panado; <sup>4</sup>Augmentin; <sup>5</sup>pneumococcal vaccine polyvalent; <sup>6</sup> Co-amoxiclav; <sup>7</sup>Astramorph-PF, Avinza, Duramorph, Epimorph, Kadian; <sup>8</sup>Apo-pen VK, Beepen-VK, Betapen-VK; <sup>9</sup>Acetaminophen; <sup>10</sup>Zyrtec, Zyrtec-D; <sup>11</sup>Metoclopramide; <sup>12</sup>Deferasirox; <sup>13</sup>Brufen, Advil, Nurofen, Motrin; <sup>14</sup>Bicitra, Cytra-2; <sup>15</sup>Xyzal; <sup>16</sup>Flixonase; <sup>17</sup>Maxolon; <sup>18</sup>Erythrocin, Ery-Tab, EryPed; <sup>19</sup>Enzone, Pramsonone; <sup>20</sup>Deltasone, Rayos, Sterapred, Prednicot; <sup>21</sup>Norvasc

### 3.5 Themes emerging from the data

Following the steps laid out in 2.5, the transcriptions were meticulously examined and the relevant themes and sub-themes were identified. The identified themes and sub-themes can be found in table 3 below and are discussed in detail in the sections to follow.

Table 4: Research themes and sub-themes

Theme	Sub-theme
1. Impact of incessant pain and illness	
2. Impact of environment	<ul style="list-style-type: none"> <li>➤ Temperature</li> <li>➤ Activity and diet</li> <li>➤ Mental stressors</li> </ul>
3. Discrimination and stigma	<ul style="list-style-type: none"> <li>➤ Treated differently</li> <li>➤ Non-disclosure</li> </ul>
4. “There’s nothing good about having SCD”	<ul style="list-style-type: none"> <li>➤ “I would never inflict this on another human being”</li> <li>➤ “Life-span” in SCD</li> </ul>
5. Coping and management	<ul style="list-style-type: none"> <li>➤ Acceptance, adjustment, empowerment and hope</li> <li>➤ Spirituality and support systems</li> </ul>
6. Healthcare	<ul style="list-style-type: none"> <li>➤ Access to healthcare</li> <li>➤ Healthcare in South Africa vs outside South Africa</li> </ul>

### 3.6 Theme 1 – Impact of incessant pain and illness

As can be expected the experience of pain, and other SCD-related episodes of illness, was a widely discussed topic by participants. Acute episodes of pain or vaso-occlusive crises (VOC) are hallmarks of SCD. Frequent VOC were a marker for disease severity and premature mortality in the Cooperative Study of Sickle Cell Disease (Platt *et al.*, 1991; Platt *et al.*, 1994), and in modern cohorts in the USA (Darbari *et al.*, 2013; Elmariah *et al.*, 2014). VOC have major economic impact due to the cost of unscheduled health care, and mostly affect the coping ability of individuals with SCD (Wonkam *et al.*, 2014b; Kanter *et al.*, 2013). In agreement with previous studies, these study participants also frequently described experiences of pain in relation to aspects of poorer perceived QOL and functioning. The incessant nature of pain and illness in SCD, and the impact it has on adult functioning is addressed under theme 1 but also throughout in relation to other experiences.

Participants reported on the unrelenting and unpredictable nature of pain and episodes of illness in SCD, along with how this impacted them:

*“Just as you say it’s not a sickness that is ok, you’re going to say I’m ok, because sickle cell you see, like right now I’m talking to you I can be ok, maybe 5 minutes after somewhere start pain somewhere start and I’m really don’t like it.” (P14)*

*“My biggest concern, I think my biggest concern is being ill all the time, because I never know when I’ll be ill, it comes any time, so that’s my biggest concern [yes] and the fact of me drinking medicine every day I don’t like that, cause sometimes I miss a day or two so I don’t like the fact of me drinking medicine all the time and, just knowing I have sickle cell...” (P15)*

This resulted in negative feelings toward being constantly ill and/or in hospital:

*“Because I was always sick, I was always sick, always sick, I can never pass two month without going to hospital for even a week. I can never pass two month, two month is too much. Yes, it was regular.” (P14)*

This repetition by participant 14 in their description of their illness is telling of how badly they feel they are affected by SCD. Many participants felt the same way, with numerous quotations emerging in the data with regards to the one constant in their lives, being sick. The quotes below illustrate:

*“It’s only, its only my life, my life is not good. It’s not good. Now I’m thank God. When I was in Congo, I was always 6 months I’m going to hospital, 6 months I’m back to hospital...” (P17)*

*“But back then it was very difficult. Cause I used to be in hospital, like, I [don’t know], practically left hospital when I was fifteen, sixteen years...cause I usually, if I go home one day then the next day I’m sick...” (P4)*

*“And I have been admitted into this hospital more times than I can count.” (P6)*

*“For me it’s not nice, because you’re every time sick and it’s not nice to be sick and permanently have back pains or your leg pains, for me it’s not nice.” (P9)*

Research by Thomas & Taylor (2002) and Fuggle *et al* (1996) showed how pain crises and episodes of illness can occur intermittently, chronically and unpredictably in SCD, with the number and duration of pain crises varying between patients. Findings in this study were similar where

participants have illustrated how they may not expect the pain and how unpredictable the attack can be i.e. “*just attacks*” (P10), “*comes sometimes unexpectedly*” (P10) and “*last some hours*” (P18). The chronicity of pain is further illustrated, with some having experienced pain since childhood:

*“When I was six or seven, I start to be sick. And then, after be sick, I’m feeling the pain, on my, on my legs and sometimes all all this pain, from head to leg.”... “In fact I grew up with that problem.”* (P13)

*“Basically, all my life I was living with the pain.”* (P7)

Severe pain episodes were described to be debilitating for certain participants, making it difficult for them to function amidst crises:

*“Uh, living with sickle cell is not easy, it’s a very painful disease I can say, it’s very painful cause when its pain, especially that starts by your foot and is going up and up, when all the body is very painful you cannot move, you cannot do nothing and just even big people become like children, crying because you cannot do anything, and uh sickle cell is not nice.”* (P14)

Even with the advances in medical treatment and care, pain is often the main reason for individuals with SCD to seek medical treatment (Ballas, 2007; Smith *et al.*, 2005). The following quotations address the theme of “pain” and highlight the participant’s helpless experiences around experiences of pain:

*“I was having crisis my body, my chest was paining me, it was difficult to breath so, I could not even walk so I couldn’t move my legs and had body pains, crisis so, that’s why they had to rush me to the hospital”* (P1)

*“Sometimes I take panado and tramadol but if it doesn’t help at all, cause sometimes it gets like really worse then I have to come into the hospital and they have to inject me with morphine”* (P16)

*“It’s hard, because for them they don’t know how you feel at all. The pain that you are feeling they will be like uh maybe it’s [going to] get fine, but when you wait it’s getting worse. They will just be there; they can’t do anything, just waiting for the ambulance to take you to the hospital.”* (P2)

Treatments and interventions are also described by participants to not always provide desired pain relief. This left participant 6 feeling “*frustrated*” (P6) at the inability to control and cope with the pain associated with SCD:

*“Every single time I get pain it makes me feel so frustrated because you can’t control it man, you know” ... “If you get sick you can go take some tablets” ... “but if I get a crisis, you can take as much tablets as you, as you want it will still be there.” (P6)*

Previous studies have shown how the chronic and unpredictable nature of pain crises can disrupt social endeavours and relationships, physical abilities, school, work and socio-economic status and overall ability to cope mentally (Booker *et al.*, 2006; Fuggle *et al.*, 1996; Thomas & Taylor, 2002; Treadwell *et al.*, 2014; Wallen *et al.*, 2014; Wonkam *et al.*, 2014a.b). Participants in this study were no exception and described how pain can impact on relationships. Even as adults, relationships within families, particularly between participants and parents, were described to be affected by participants’ health. Participants 10 and 11 illustrated how being ill affected their mothers’ emotional states profoundly:

*“Uh, I didn’t, if I was in pain I wouldn’t like cry so much because I know my mom’s going to be worried and then I’d just say ‘I’m not feeling well, can I go to the hospital’ or something. I won’t show that I’m in pain because my mom will feel like terrible.” (P11)*

One participant described that he felt his masculinity was taken from him:

*“Then I land up in hospital. Then she’s [my mother] like, she’ll be crying on the bed saying ‘you know what, I told you, I told you, I told you!’. And then to see your own mother, kind of go through that experience, ok now I feel like really not a man.” (P10)*

Participants also described how pain affects marriage:

*“So now that I’m older, I’m married and there’s things I need to do and it’s just more difficult, because I’m always tired and I’m, everyday I’m in pain” ...“...like even now today, there’s some stuff I would like to do, like with my husband, cycling, and I can’t cause once I do it then I get the pain.” (P3)*

Findings in this study are consistent with previous studies that have shown that adults with SCD experience disruptions in various relationships due to their health, with pain being a main contributor (McClish *et al.*, 2005; Coleman *et al.*, 2016). Thomas & Taylor (2002) illustrated how pain does not only impact on relationships but can impact on ability to achieve academically, with

constant bouts of absenteeism affecting achievement and motivation to achieve in the academic field. This study showed consistent findings in that participants experienced regular absenteeism, due to pain and poor health, and this was perceived to hamper their academic progress:

*“Yes, cause sometimes I’m not at school for 2 weeks, or 1 week then you miss out on stuff and its ok writing it but you don’t know the explanation all that stuff, and it’s difficult if you get an assignment and you weren’t there when they’re explaining.” (P11)*

*“... but because of my health... especially during the, exams, I have to, I fell sick, so I won’t take that exam. So, it made me to be kind of a struggle to my education...So most of them [friends & family] have uh finished university out me I stay struggling just because of my health, it affected me!! So much!” (P18)*

*“Cause being in hospital for 6 months and doing exams at school as well it’s not kind of, it’s tough, so you [have to] write exams in hospital, and then teacher comes in picks it up and takes it to school, it’s kind of, you’re also bothering other people as well.” (P10)*

What also emerged from this study is that participants worried about their ability to further their education and therefore their careers. This stemmed from their experience with the serious and unpredictable nature of pain crises and other health issues associated with SCD and was illustrated by quotations from participant 8 and participant 16:

*“I feel nervous cause, if I get sick in [university] then, cause [university] is very, it’s not like high school, it’s very, its each man for themselves, so if I get sick and I miss out on a lot of work then it’s [going to] be very tough for me to catch up on that. So, I’m just worried about missing out on school.” (P8)*

P16: *“It actually worries me, even like now if I’m absent a lot at school it actually affects also the studies a lot, like I’m also worried like um, maybe that’s what I think like I might have a certain crisis that will like not permit me to ever got to school again, that’s actually my worry”*

Interviewer: *“To ever go to school again? What do you mean by that?”*

P16: *“...to ever like go to school again like have a certain crisis that won’t enable me like to become a doctor, or something like that, and change my career.”*

Academic achievement is not the only part of adult life affected by SCD. Pain and poor health has also been reported by numerous studies to impact on employment opportunities and abilities (Wonkam *et al.*, 2014b). 13 out of 18 participants interviewed spoke of how they felt SCD-related

health consequences negatively impacted their employment status. Participants that hadn't currently sought employment worried about being unable to obtain future employment due to their health and fears of getting sick:

P9: *"mmm, I'm, I'm just scared I won't have the job long cause of my condition."*

Interviewer: *"What are you scared about the most, that's [going to] affect your job?"*

P9: *"I'm scared I'm [going to] get sick at work maybe so."*

Interviewer: *"So you said you don't work, are you not working because, because of studies, or because you feel like...?"*

P1: *"Mostly because of my health."*

Interviewer: *"Ok, you feel like it will be too much to work as well?"*

P1: *"It will affect me, I will get sick a lot."*

Other participants that do currently work explained how they perceived their health to affect their ability to do their job:

Interviewer: *Ok, so do you feel like your health affects your ability to work?*

P15: *"I think so sometimes yes, because whilst I'm, it's because of my weakness again like, I'd be, I'm not like others they're strong compared to me. Me when I stand up maybe one hour to two hours I start becoming really weak, [yes] so like that's why it affects, it affects me a lot."*

P6: *"Not only getting, DOING my job, here as well, cause in IT [internet technology] like I said you always need to be there you need to be available. When you're sick for a week I mean, there can, it can do lots of damage to your career. Cause if you're working for a company for three years or two years"...and you're sick maybe, once every three months"....."then they [kind of] look at you like prejudice, this guys doesn't want to work or he's..." (P6)*

Like younger participants who experiences barriers in achieving optimally at school or university, older adult participants described difficulties in the sustainability of employment. Participant 6 highlighted two key difficulties faced by working adults living with SCD. The first point being that obtaining and maintaining work whilst living with an unpredictable chronic condition can be very challenging. The second difficulty is that adults with SCD face prejudice or discrimination in the workplace (as discussed further in theme 3). Other participants described how they had struggled to maintain employment due to health complications associated with their condition:

*“I’m not working because of it! I have to drop everything because the nature of my work, all the time will be sick, so I have to drop it!” (P18)*

*“Um, no currently, no I used to [work] then I kind of lost the job... I’m on leave to many times. I’ve got heart problems and blood transfusion, medication, so the boss [kind of] said ‘uh, uh’” (P10)*

The results from this study support what is well known about how adults with SCD face key challenges in getting and maintaining employment (Dos Santos & Gomes Neto, 2013). As seen in this study, and reported by Thomas & Taylor (2002) within a British cohort, Treadwell *et al* (2014) within an American cohort and Vilela *et al* (2012) within a Brazilian cohort, the chronic and unpredictable nature of their condition is often the root cause of not obtaining adequate education and/or sub-sequent employment. It has been documented that adults with SCD have higher unemployment rates than the general population (Abrahams *et al.*, 1994; Laurence, George & Woods, 2006), and this was consistently seen within this study population as 13 out of 18 participants were unemployed. The fact that many employers fail to be accommodating to the variable nature of the condition (Wonkam *et al.*, 2014a, b) can often result in not obtaining or maintaining employment which itself has negative financial implications (Thomas & Taylor, 2002; Treadwell *et al.*, 2014). It is interesting to note that the negative effects SCD has on employment is consistent across middle-income countries such as South Africa and Brazil (Dos Santos & Gomes Neto, 2013; Vilela *et al.*, 2012) and high-income countries such as the UK (Thomas & Taylor, 2002) and the USA (Treadwell *et al.*, 2014), alluding to the significant impact this condition can have on patients functioning and HRQL sometimes despite available resources.

Participant 18 illustrated this when he explained how not being able to work affected his financial status and that his wife and friends have had to support him:

*P18: “You know by going to work, and doing this it wasn’t easy. Its affected me a lot that’s why now I’m doing nothing now in fact because of it. Honest. So, its affected me! To you know, I, I, I, I can’t live a normal life like others.”*

*Interviewer: “...how’s the family being supported?”*

*P18: “It’s my wife and I have a, I’m getting a grant but it wasn’t easy for us we are still you know, coping by the grace of God and the help of friends.”*

The impact SCD-related pain and episodes of illness has on education and employment can lead to not only poorer financial well-being, but poorer psychosocial and emotional functioning which can affect HRQL (Dos Santos & Gomes Neto, 2013). Psychosocial implications include lowered self-

esteem, depression and decreased social functioning (Anderson & Asnani, 2013; Nadel & Portadin, 1977; Treadwell *et al.*, 2014).

Due to the significance of incessant pain, there is an urgent need for healthcare professionals to better understand potential precipitants of pain, how patients experience pain and how they feel it affects their HRQL. This knowledge will allow for more appropriate healthcare interventions to be put in place to help patients prevent or manage pain and other SCD-related health complications. It will also assist in guiding healthcare professionals on how to better counsel/educate patients on how to prevent and/or manage pain and their health more effectively, with the goal of improving HRQL. This information can further support how healthcare professionals should also remain cognisant of not underestimating pain in SCD as has been previously described (Adewoyin, 2015; Ahmed *et al.*, 2015; Coleman *et al.*, 2016). Genetic counsellors' can assist in referring patients to social workers if appropriate or to mental healthcare professionals that can address negative experiences around deterioration in school or work life, and address psychological implications of strain or deterioration within relationships (Weil, 2000).

### **3.7 Theme 2 – Impact of environment**

Theme 2 discusses how participants felt various environmental factors affect their well-being and functioning, with pain being a significantly discussed consequence. Participants explained how they felt the weather and cold water causes pain and affects their ability to function. They explained how poor diet, of which can be attributed to socio-economic circumstances, and physical activity most often negatively impacts their health, often resulting in pain. Mental stressors such as increased stress levels and poor attitudes were also described as a contributing factor to increased pain episodes, worsening health and perceived HRQL. Evidently, “pain” continues to run through this theme, reiterating the negative impact it can have on perceived HRQL in SCD.

#### **3.7.1 Temperature**

When analysing the data, the main environmental factor that emerged as contributing to worsening health and increased pain episodes in the research cohort was temperature, as described by at least half of the participants. Temperature can refer to weather conditions as well as to the temperature of water as both were reported as precipitating factors contributing to pain crises and other health complications:

P2: *“Like, uh, the best, the season that I can say I can’t survive, is like this winter.” ...When it’s cold, when I get the cold, I get crisis” .... “When its summer. When it’s too much hot temperature, I also got, crisis”*

P14: *“Because in Congo I was always sick [yes], also with the weather, the weather in Congo there there’s no winter, there’s only summer its always hot, and especially when it’s hot I’m not ok. I have, have allergies under my skin, because of hot and I mostly fall sick as well, when it’s hot, [yes] but here I saw it’s different.”*

One participant described the impact cold weather has on his health resulting in him only being able to work in the summer months. Again, pain emerges as a factor hampering employment abilities:

*“If the winter is coming, I can’t work, because I’m feeling cold and that cold is cause the bones to, to pain [yes]. I’m working only on summer.” (P17)*

The ability to work only during certain seasons affects one ability to earn a stable income which in turn affects socio-economic circumstances. Poor socio-economic status can limit one’s access to adequate nutrition (discussed further in 3.7.2) and healthcare and can result in poorer HRQL. Similar to this study, Dos Santos & Gomes Neto (2013) also demonstrated, in a Brazilian cohort, the negative effects socio-economic status has on access to adequate care and therefore HRQL for patients in low to middle-income countries.

Participants explained various steps they take to avoid the negative impact the weather can have on their health. This further supports how participants feel that environment may be a strong contributing factor to pain and other health problems:

*“The way for me to be a little better is like, maybe I should just keeping myself warm so that I cannot be having the pains in my body. I should not expose my body to too much cold so I think I will not having much pain in my body.” (P5)*

The findings from this study were consistent with previous findings whereby the correlation between weather factors and pain episodes has been described. Both extremes of hot and cold weather are described to correlate to increased pain episodes and hospital admissions (Amjad, Bannerman & Judisch, 1974; Dessap *et al.*, 2014; Redwood *et al.*, 2014; Westerman *et al.*, 1997), with Brandow *et al* (2013) showing that this may be due to those with SCD having hypersensitivity to thermal stimuli.

It is not only weather that affects the health of individuals with SCD. Resar & Oski (1990), amongst

others, have shown that exposure to cold water is seen to precipitate pain crises in certain individuals. One participant illustrated this:

*“I can’t swim, in, for like a particular long period of time, in water, because I will get cold and then I will kind of have a stroke. Or I’ll get paralysed one side of the body, or, it kind of depends because water for me is not good. Even if it’s just surfing, I used to do, my mom said: ‘You better cancel it before you end up getting sick’ and when you get sick, my throat will swell up and I won’t be able to eat or breathe and then my chest will literally be on fire, it’s like I’ve got heartburn and my whole body will just start sweating...” (P10)*

Other participants didn’t experience as extreme reactions as participant 10 but they also described how they perceived cold water to induce pain episodes and also impacted on participation in social activities:

*“It’s been really hard because, I can’t have fun, like on family trips I can’t have fun because, like go into cold waters...and I get joint pains.” (P7)*

The rationale behind how being cold affects patients with SCD lies in pathophysiological changes. Cold leads to vaso-constriction reducing the rate of blood flow through peripheral blood vessels. This in turn reduces the amounts of oxygen in blood within these vessels allowing for easier polymerisation of HbS and vaso-occlusive events that result in pain. Another thought is that vaso-constriction induces avascular necrosis by diverting blood away from actively producing bone-marrow (Serjeant & Chalmers, 1990; Tewari *et al.*, 2015; Mohan *et al.*, 1998). The reported effects of extreme heat on patients’ health is likely due to dehydration which results in increased HbS polymerisation, VOE and pain crises (Tewari *et al.*, 2015).

While cold water is one avoidable environmental factor, climate is out of a person’s control making living in a country with cold winters and very hot summers difficult for participants. There is much variability in the expression of SCD and recent works suggest that environmental and social factors may also influence this variability. Authors have recently used geographic information systems technology to examine the association between socio-environmental exposures and health outcomes in all persons with SCD in Jamaica (Asnani *et al.*, 2017). Another study has shown that environmental factors do explain some of the variations in rates of admission to hospital with acute symptoms in sickle cell disease in London and in Paris between 2008 and 2012 (Piel, Steinberg & Rees, 2017), but the associations are complex, and likely to be specific to different environments and the individual's exposure to them.

Since weather conditions are unavoidable, participants should be educated/counselled on weather as a precipitating factor for vaso-occlusive events and the potential impact of temperature on their health. This will guide them in understanding how to better protect themselves from the cold and/or stay well hydrated in the heat, with the goal of reducing pain crises and improving HRQL (Yale, Nagib & Guthrie, 2000).

### **3.7.2 Activity and diet**

#### **Activity**

Of the participants that discussed effects of physical activity and exercise on their health, all except one explained how they perceived it to negatively impact their health, with the main consequence being pain crises:

*“let`s say if I ever walk myself, like engaging maybe excess, too much exercise, like or lifting things, heavy things, like moving things that are too heavy, for a very long time so, maybe when I engage in exercise for like 2 hours when I stop I will start in crisis.” (P1)*

Effects of physical activity on health in SCD have been previously described with patients having reported pain episodes following strenuous activity (Tewari *et al.*, 2015). It is known that exercise induces certain hypoxic states and metabolic processes that can induce HbS polymerisation, vaso-occlusion and haemolysis with adverse effects on patients’ health (Connes *et al.*, 2011; Faes *et al.*, 2014; Tewari *et al.*, 2015). Hypoxic states can also be induced even with moderate physical activity however the clinical effects are not well known (Halphen *et al.*, 2014). Participants however described the effects of moderate activity, such as walking short or long distances, as affecting their health by causing weakness, light-headedness and even blackouts.

Participants felt that due to knowing the negative consequences of physical activity they refrained from certain activities:

*“So, also I don’t want to go swimming and go to the gym and go running cause I’m afraid I’m get a crisis it’s not nice.” (P6)*

*“I don’t do sports” ... “Because I’m scared that I’m [going to] get pains again.” (P9)*

This however can leave participants feeling frustrated by being limited in what they wanted to do and some felt it affected their personal and social lives:

*“...its actually hard to live with sickle cell because like there's certain things that you can't*

*do, like there's certain sports that you can't play like, um, sports that require lots of energy and stuff you can't gym and all this type of thing so you have to live like um, you have to live like a different lifestyle from what you want..." (P16)*

*"And, I just want to live a normal life... to, go about things and, it also affected my personal life where, I couldn't do certain things like swimming, running, soccer things like that. I've gone backwards" (P6)*

*"I did play some soccer I tried to fit in with everybody, but, I knew at the end of the day that you know I'm out of breath I can't do this, I can't run that fast, or that far...and I would just sit out." (P6)*

Although participants described exercise and physical activity to negatively impact on their health, causing pain and other co-morbidities, it is reported to confer protective effects on cardiovascular health and can have social benefits for patients (Tewari *et al.*, 2015). This is important to consider since participants described feeling left out in social activities due to their perceived inability to do certain physical activities. For the above reasons, pros and cons of exercise in SCD need to be weighed up between patients and healthcare professionals (Tewari *et al.*, 2015), whilst being educated on avoiding exercising until fatigued or dehydrated (Yale, Nagib & Guthrie, 2000). This can assist patients to find a way in which they can try to live their lives as normally as possible. One participant did illustrate the benefits of exercise in SCD when he explained how he sees engaging in physical activity as beneficial to his overall health:

*"I play rugby which is not, I'm not supposed to be doing that and um, I've recently joined the gym to start um building up my immune system and everything cause I've noticed that like um, whenever I do sports, that's what I've noticed, whenever I do sports, like the shortage of breath and stuff like that it actually, like it minimises and stuff, but once I stop it just gets worse and that's when I actually get my crisis and stuff, yes." (P16)*

## **Diet**

One participant illustrated how he perceived poor diet to affect his health. It has been documented that due to the chronic nature and physical demands of the condition, individuals with SCD already experience both micro- and macro-nutrient deficiencies all which impact on immunity, sexual maturity, growth and well-being (Heyman *et al.*, 1985; Hyacinth, Gee & Hibbert, 2010; Hyacinth, Adekeye & Yilgwan, 2013). Dietary intervention using protein and energy supplements are seen to improve health in SCD, showing evidence for how supplemented diets can improve overall wellbeing and HRQL (Heyman *et al.*, 1985; Hyacinth, Adekeye & Yilgwan, 2013).

Participant 13 explained how inability to find permanent work and subsequent socio-economic circumstances resulted in reduced access to adequate or nutritious food, contributing to pain and worsening health:

*“... And I help them I cut [customer’s hair] 2 or 3 I get R30 or R50 a day, how can I share with my family, it’s going to be difficult, that what I’m saying about food for me it’s difficult and the rent” ... “And then because I didn’t eat nice, I’m start to feeling the pain this side. If I eat I’m vomiting. I can’t go the toilet, the toilet stopped. No appetite, weakness, tired and then I go to the clinic.” (P13)*

*“I was not able to work...but here I have to come to clinic because the food which I’m eating is not enough... And if I’m eating bad at home, when I come to clinic they saw and they know then, there’s something wrong about me. And then I said to explain them, the food which I’m eating is not enough, because I’m losing my weight. But if I’m eating very nice example I get money I eat very nice, I can go 60 or 58 kilograms.” (P13)*

This participant highlighted one aspect of how socioeconomic circumstances can affect health. It is known that poorer circumstances are associated with worsened health outcomes and QOL (Marmot, 2005). Since SCD is most prevalent in poorer countries (Piel *et al.*, 2013), the potential impact of poverty on HRQL in adults with SCD is important to highlight.

Poor socio-economic circumstances highlight a need for social worker intervention to assist patients in finding employment. This said, certain patients in South Africa are refugees or asylum seekers and some have allowed their permits to live and work in South Africa to expire. In these circumstances, there is no way for social workers to assist these patients. It is also important to consider unemployment rates in South Africa which are amongst the highest in the world at 27.7%. This means that even for those willing and able to work, around one third will not find employment (Trading economics, 2017). Since ability to work is seen to be affected by poorer health in SCD (as discussed in theme 1), this adds to the dilemma. Finding work for both local and migrant patients may therefore prove challenging, bringing to light a huge barrier to improving QOL from a socio-economic stance.

### **3.7.3 Mental stressors**

The data suggest that participants perceive emotions and mental state to have an impact on their health. Two participants reported on how they felt that pain crises can be brought on by emotional stress and poor mental state. This is illustrated by participant 2 below:

*“Sometimes when I’m feeling down I just need to be alone because uh, the more if I get stressed I also get sick, I get crisis, so I just try to keep it to myself, just be alone be quiet, then just let it go.” (P2)*

One participant spoke about how both the upper and lower extremes of emotions or moods affects her health:

P4: *“Yeah, because you find that sometimes, I never used to understand it, um, if I’m extremely happy then that adrenalin and stuff, it just (clicks fingers) knocks you into a crisis and then, when I’m too too sad, I [don’t know], so I always try to stay balanced.”*

Interviewer: *“If you’re, if you say you’re too sad, what happens then?”*

P4: *“Like, the crisis starts, I actually feel everything, the whole-body pains, everything muscle aches, every- you know just like that pain crisis that you get.... understand?”*

Interviewer: *“Ok. That’s very interesting that you say the emotions also...”*

P4: *“[Yes], cause often you hear it’s just the, um, too much exercise too cold, too warm, nah, its emotions also.”*

The few studies published on the effect of emotional and mental state on patient health in SCD have shown that a triggering factor for pain crises can be emotional stress (Gil *et al.*, 1989; Leserman *et al.*, 1998; Porter *et al.*, 2000; Serjeant *et al.*, 1994) as was seen in this study. Porter *et al* (2000) showed that increased stress and negative mood correlated with frequency of acute pain episodes and is therefore thought to play a role in onset of SCD-related pain. In SCD, Gil *et al* (1989) and Thompson *et al* (1992) showed how positive mood and perhaps more adaptive coping can result in less hospital utilisation further supporting how state-of-mind can affect one’s physical health.

Findings of the upper extreme of emotions as a precipitant to pain is likely a novel finding in this study, however participants descriptions of how they found negative emotional state to be more of a precipitating factor for pain crises is consistent with previous findings. Overall this highlights a role for genetic counsellors to explore patients’ psychosocial needs in terms of coping styles and support systems and to suggest potential interventions or make appropriate psychological referrals with the aim of lessening stress, subsequent pain crises and need for medical interventions (Porter *et al.*, 2000; Weil, 2000).

The high variability of symptoms experienced by individuals living with SCD can in part be explained by genetic factors however after extensive research much of the genetic contribution to phenotypic variability is unknown. The remainder of contribution to clinical variability is likely due to environmental factors (Asnani *et al.*, 2017; Dessap *et al.*, 2014; Tewari *et al.*, 2015). This study’s

findings are in agreement with others who have described temperature, activity and diet and mental stressors as affecting overall HRQL, but are important to introduce to understand how environmental factors can influence health outcomes for patients living with SCD in South Africa. This will allow healthcare professionals to adequately counsel patients on how to minimise environmental factors from affecting their health and potentially allow for more appropriate healthcare policies that cater to patients' additional psychosocial needs to be put into place (Tewari *et al.*, 2015).

### **3.8 Theme 3 – Discrimination and stigma**

Stigma in terms of disease is defined as an association of disgrace or public disapproval with an attribute of a person or group of people with a condition (Jenerette & Brewer, 2011). Discrimination is when a person or group of people is treated differently, particularly worse, than others due to race, sexuality, gender, disease status etc and is often a consequence of the negative attitudes and feelings that stigma evokes (Bediako *et al.*, 2016; Jenerette & Brewer, 2010).

Participants explained how they experience discrimination and stigma in various aspects of life, including within education, employment, families, friendship circles and personal relationships. Participants perceived family members, friends, work colleagues and society to treat them differently due to their condition. Being treated differently was seen to have various negative social and emotional consequences for participants and often led to non-disclosure of disease status.

#### **3.8.1 Treated differently**

Participants explained how stigma and discrimination presented in their daily lives in the form of being treated differently within friendship circles. This left one participant feeling left-out:

*“Most of my friends in Nigeria that knows I have sickle cell, they treat me differently. They treat me like, like with care or something like, most times I want to go for activities or go out for parties, they say no I can't go with them. They don't want me to fall sick there so they will be in trouble, so. I get left behind I know that.” (P1)*

Three other participants felt similarly to participant 1 where they explained how friends, family and/or teachers took pity on them or treated them differently, much to their frustration as they feel *“we're the same”* (P10) and they *“wanted to be treated like any other”* (P15) as not to be *“left out”* (P11):

P10: *“... they felt pity which I don't kind of like in a way, cause I don't like people thinking*

*'aaaw, Peter you sick, can you sit..', I'm perfectly fine, I'm not dying any second soon so...'*

Interviewer: *"Is that your family or friends as well?"*

P10: *"Friends who used to kind of think 'ok, ok he needs, treatment he needs attention', I thought 'Guys, if I can walk and I can sing and I can talk and I can dance, I don't need no special treatment from teachers or from principles!'"*

P15: *"If maybe a child is late or something they [her school] punish the child but then when it came to me they wouldn't do that because they were afraid that my sickness.... they had to treat me a bit special than others."*

Being treated differently was also described within relationships with parents and siblings. Participants explained how their parents tended to treat them differently growing up in the fact that they see them like an *"egg on a flat tray"* (P4), leaving participants feeling *"suffocated"* (P4), *"undermined"* (P8) and feeling that siblings were neglected due to parents paying them more attention:

*"My mother, especially my mother because others they are not sickle now, so when my mother is kind of uh the way, [yes] she used to treat me it's not the same way to tell others, because it's kind of a pampering me. Because I'm always sick and she's one that suffering carrying me up and down. Running () you know, so it doesn't help to my other siblings."* (P18)

Further, within child-parent relationships, participants described how they felt their parents have held them back from doing certain activities, due to fear around their health, and how this was perceived to affect their social lives. Participant 8 illustrated this point:

*"They [her mom] think you're so fragile you can't do most of the stuff that other people can."*

*"Like my mom, so she, she she's really scared of me getting sick so she stops me from doing things that I'd like to do, so for example taking part in plays at school... or doing sport, or other, going to camp"... "Um, I've missed out a lot of social things at school so..."*

Within families, one participant also expressed her experiences with discrimination whereby she described feeling like a *"burden"* on her family, sometimes feeling *"unwanted"*:

*"...I went through kind of a lot in terms of this sickness, so I don't want them [future children] to be, to feel the same, to feel like unwanted, sometimes unwanted."* (P15)

*“Yes sometimes I feel like I’m a, I’m a like I’m a disapp... not disappointment but like I feel like I [pause] this word not coming... I feel like in the house, I, they take care of me so much I feel like, um, something like a burden, I feel like I’m a burden, so I feel like maybe like if I wasn’t there the problems, because I know sometimes they spend a lot, they take care of me a lot, so I feel like maybe now, so I don’t want them [future children] to feel like a burden and stuff...” (P15)*

These quotations also importantly highlight how participants experiences have impacted on their decisions and emotions surrounding children, which is discussed further in theme 3.

Fear regarding participants and their health over flowed into friendships as well, and was described by participant 1 to have left him feeling socially isolated. Because QOL is affected by social behaviour (Mann-Jiles & Morris, 2009), genetic counsellors can play a crucial role in addressing social isolation and the overall psychosocial impact living with SCD has on patients.

*“Like I was, amongst my friends right, I was treated like being left out or over protected or most times when they go to party or go to friends for visit or maybe just having late nights they just leave me out. Nobody wants to take the risk in case I fall sick so.” (P1)*

One participant explained how generally in his life people have treated him like he is not human, illustrating the significant negative emotional impact stigma and discrimination can have on people:

P17: *“There’s someone there, some of them they talk to me like, some of them they talk me like I’m a not a human being.”*

Interviewer: *“What exactly are they doing that making you feel like that? How are they treating like you’re not a human?”*

P17: *“I don’t know, I don’t know, I don’t know.” (Started crying)*

Personal relationships were also described to be subject to perceived discrimination due to participants’ condition:

*“Um, like he’s [going to] see me different [if she discloses her condition] or maybe if we go out he’s [going to] be like ‘don’t do that you’re [going to] get sick’. I don’t want people to pity me or to always like ‘no you don’t want to do that’, and all that stuff so.” (P11)*

Only one participant spoke about how SCD affects sexual functioning. It is known that SCD can negatively impact sexual function with priapism, a long and painful erection, being a responsible

factor in males. Priapism in SCD can cause pain and shame for patients and has in turn been linked to decreased HRQL (Crane & Bennett, 2010), as illustrated by participant 13:

*“2006 when I have, 21 something like that, my penis start to be like this [holds index finger up straight]. If it’s, erection, normally I’m feeling to do a sex, if I’m doing sex, I’m feeling the pain. I avoid to that. They say maybe if you do that it can go to be soft, try to do sex, nothing, pain, every time pain.*

### **Stigma and sickle cell trait**

Another interesting and previously described finding around stigma and discrimination in SCD was seen within personal relationships around SCT carrier status. A few participants described how they would find it unacceptable to knowingly reproduce with a person carrying the SCT as this could lead to an affected child. Participant 18 illustrated this when he explained how his wife not knowing/disclosing her carrier status resulted in them having a child with SCD. The child passed away leaving him feeling grieved and upset with his wife:

Interviewer: *“Ok, so when you found out your wife was AS...”*

P18: *“...but there was nothing else I can do, because we had married already. You understand, because I ASKED her before we were engaged ‘I am sickle, I don’t have to marry AS, or go and marry sickle’. I’m looking, I looking for a trouble for myself because I know my genotype so no need for me to be testing my God. No I tell her too, she say ‘ah, when they were in university they tested her everything she’s AA’. And then I don’t bother I just say ‘Ok no problem’ that’s why we didn’t go and do another test.”...”I believed, but I say ‘how that it’s a sickle?’ the first issue, about age of three we lost him [his son], so.”*

He then went on to explain that he wouldn’t have married her if he had known her carrier status:

*“If, if like she had told me that time I asked her she’s AS, the marriage is no good. Because of course now the marriage I have to go and look for somebody we are the same blood something so that we cannot have a sickle. If we have an AS no problem, I go thought I should marry, I will marry somebody as I am sickle now I don’t have to go engage for SS, I should marry something like AS or AA, but the best one is AA.” (P18)*

Participant 5 further supported this point:

*“...it’s very difficult if I fall in love with someone like that [referring to carrier of SCT], uh, I don’t think, I will tell her that man, it’s not possible.” (P5)*

Two studies, conducted in a Nigerian population, indicated how over 60% (Nnaji *et al.*, 2013) and 80.8% (Adewoyin *et al.*, 2015) of participants respectively were against marital union of two SCT carriers, further supporting how people perceive SCD to negatively impact HRQL. With regards to carrier status, Nnaji *et al* (2013) discussed how neglecting to disclose/know carrier status could either be linked to inaccurate laboratory reports or perceived stigma (Adewoyin *et al.*, 2015; Taiwo, Oloyede & Dosumu, 2011), reiterating the significance of stigma around SCD. Participants opinions around marriage to a SCT carrier illustrated two points: firstly, how the participants perceive SCD to negatively affect their own QOL, and secondly the impact SCD can have on adult and family relationships, with the potential to affect current relationships and the ability for adults to find suitable life partnerships.

Educating patients about their condition, genetic cause and occurrence and recurrence risks are a vital part of genetic counselling. Genetic counsellors therefore play an important part in this setting whereby they can educate affected or at-risk couples regarding reproductive risks, pre-marital screening and reproductive options, to ensure they make informed decisions regarding family planning. They can at the same time address uncertainty or anxiety patients may have around these subjects, thereby providing emotional support (Abioye-Kuteyi *et al.*, 2009; Adewoyin *et al.*, 2015b).

Adults with SCD may experience negative feelings and emotions such as being different, misunderstood, over-protected and isolated all of which translate as health-related stigma and discrimination and can impact on various relationships (Ahmed *et al.*, 2015; Anderson & Asnani, 2013; Jeanerette *et al.*, 2011; Treadwell *et al.*, 2014).

### **3.8.2 Non-disclosure**

Being stigmatised or discriminated against, due to having SCD, can extend into various aspects of patients' life including within education, employment and social and family relationships (Bedaiko *et al.*, 2016; Kass *et al.*, 2004; Treadwell *et al.*, 2014). Similar to Jeanerette *et al* (2011) who showed how due to experiences of stigma, that patients had concerns regarding disclosing disease status, participants in this study also spoke of non-disclosure out of concern with being treated differently or excluded:

Interviewer: *“So are you feeling a bit more included here? In South Africa with friends?”*

P1: *“Yes than Nigeria.”*

Interviewer: *“And do you feel like that’s because you didn’t tell them [about his condition]?”*

P1: *“Yes that I’m actually thinking, because Nigeria they knew because that’s how they treated me, so I took the initiative like ok since I’m here now I’m not [going to] tell anybody, for now.”*

Participant 1 has clearly experienced discrimination from his friends back in his home country and this has led to him deciding not to disclose his status to his new friends in South Africa. Although protecting himself from stigma or discrimination, participant 1 has highlighted an important dilemma, which no one will know how to assist him in a serious crisis if he is unconscious or unable to communicate:

*“Sometimes I think about it but I just tell myself, anything happens I’ll call the ambulance myself” ... “I just take the risk...” (P1)*

Not getting timeous treatment for medical emergencies in SCD can result in very poor health outcomes and possibly even death (Ahmadi *et al.*, 2014), with many deaths in SCD being unexpected (Mann-Jiles & Morris, 2008). This raises an important issue around the need to lessen stigma in patients’ lives to allow them to reach out when necessary. Participant 6 nicely illustrates how those with SCD experience health-related discrimination within the workplace, where he has not disclosed his status out of concern for employers seeing him in *“a different way”*, affecting the possibilities of being promoted and future career opportunities:

*“Well, they’ll, they’ll look at me like the sick guy and we need to, not give him this or maybe, in my company the way it works is, it’s like an IT company where we design code and there’s so many opportunities for me” ... “So let’s say an opportunity will arise and they will look at me in that way and maybe that will be the reason I won’t get that position.” (P6)*

P6: *“Or if I do get sick or if I do get a crisis I kind of need to hide the fact that no I have this disease and they’ll look at me differently” ... “So this is also one of the other difficulties I have finding work, like these guys that I’m working for now they don’t know I have....”*

Interviewer: *“Have you not told them?”*

P6: *“I’ve not told them... because, I really needed the job....and you don’t want this to be the reason why I wouldn’t get the job.”*

Overall the participants generally weren’t comfortable disclosing their disease status, especially to those outside of families and close friendships, as to them it was a private matter. This is likely due to their experience of people treating them differently due to their condition, which can hamper them in achieving in certain aspects of life. This data is consistent with previous research that shows

adults living with SCD, and other chronic conditions, often face health related stigma and discrimination (Bediako *et al.*, 2016; Jenerette & Brewer, 2010; Sankar *et al.*, 2006), in social and personal relationships, education and employment and healthcare (Mann-Jiles & Morris, 2009; Treadwell *et al.*, 2014), although discrimination within the healthcare system did not emerge from this study data.

The impact of these experiences has been described to significantly affect patients' psychological well-being, affecting confidence and social functioning, thereby impacting on patients' HRQL by increasing pain crises and depressive feelings (Bediako *et al.*, 2016; Jenerette *et al.*, 2012; Ohaeri *et al.*, 1995). Further studies that look at the impact and root of stigma in SCD are needed to assist in implementing appropriate educational programmes for both the public and healthcare professionals. Education may serve best to reduce stigma associated with chronic diseases (Weiss & Ramakrishna, 2006). The role for a genetic counsellor in this regard entails addressing the layers surrounding patients' feelings of stigma and social isolation, and help them adjust to life with a chronic disease (Weiss & Ramakrishna, 2006). Genetic counsellors may assist in working with patients to find interventions that address and reduce stigmatisation or the guilt or shame experienced around their condition, whilst helping patients to understand the underlying reasons for why people may be stigmatising them. Even the action of the genetic counsellor providing an open and empathic approach to listening to patient's struggles can be in itself helpful and healing (Weil, 2000).

### 3.9 Theme 4 - There's nothing good about having SCD

Overall this theme serves to interlink and conclude themes 1 through to 3 (see figure 2) whereby participants have mainly spoken of the negative impact SCD is perceived to have on their HRQL:

*“So, so it's not good, you understand for someone being a 'sickler', no no no! It's not good, you understand that, the sickness is not good.” (P18)*



Figure 2: i) Pain and its impact, ii) Effects of environment that often result in pain and poor health outcomes and iii) Health-related stigma and discrimination as experienced by participants all tied together to lead participants to describe how “there’s nothing good about having SCD”.

As described by this study’s participants and participants in a study by Thomas & Taylor (2002), the unrelenting nature of SCD comes with many illness-related stressors making it a difficult condition to function, live and cope with as an adult (Thomas & Taylor, 2002). Participant 9 outlined her feelings towards learning about her diagnosis and condition whereby she explained how she was *“devastated!”*. This nicely illustrates the overarching negative perceptions around how having SCD can impact one’s well-being and perceived HRQL. Participants’ negative feelings about their HRQL were further illustrated when participants spoke of their own fear of having

children with the same condition, and when they illustrated fear around early death due to their health.

### 3.9.1 “I would never inflict this on another human being”

The discussion that led to this sub-theme was mainly around how participants felt about having affected children themselves. Participant 4’s response to this question: “*Due to the fact that I knew how I grew up, I don’t want to inflict it on another human being.*”, led to the development of this sub-theme title. She noted how “*I don’t [want to] breed more of me*” indicating her deep seated negative perceptions on living with SCD.

15 of 18 participants explained how they would not want to have an affected child due to knowing what it is like to live with SCD. Indirectly this question allowed participants to express how they perceived their own HRQL to be because of their condition. The following quotations illustrated this:

Interviewer: “*And what are your thoughts if your, if one of your children did have to have the same condition?*”

P6: “*I’d just break down, because, imagine knowing all of these things and now your kid has to go through this*”

“*It’s a choice I made I don’t want to have babies, because its, I saw myself growing up. Not that I’m saying necessarily that they might have sickle cell it just depends maybe with the husband you get, what, chromosomes and bla bla bla, but, just taking that chance, you understand, its...I don’t think I can handle it for my baby, or, [yes] I don’t think I’ll handle it.*” (P4)

When participant 10 was asked about how he would feel if his children did turn out to have SCD he explained that he would be “*devastated*” due to his experiences of living with SCD, which he described as “*difficult*” and a “*struggle*”:

“*I was actually afraid to have children at all because I told myself ‘ok, if I’m sick, why would I actually try to put that on another person or another child who has the same [experience], what I’ve been through it’s not easy to put a person or another child what you’ve been through.’*” (P10)

Other participants felt very similarly in that they fear having affected children that would have to go through what they did:

*“I’m scared, I don’t want them to have sickle cell like me it’s terrible”... “I don’t want them to go through, go through the same pain and to be two people now that have sickle cell the mom, and the child.” (P11)*

*“...Uh that cannot be ok for me to have children, because it’s very painful to see your child suffering as I do suffer myself and I don’t want that pain to follow me again...” (P14)*

Although the above quotations illustrate the fear of participants potentially having affected children, participant 18 has himself had a child with SCD. He described his experience of both living with SCD and having a child with SCD who sadly passed away from the condition:

*“No, I have a very terrible...I would... FEAR! No because that time I know that I’m passing through I don’t want my I don’t want to see my children pass through what I’m, I pass through because it is not easy. The life of sickle is anything can happen. And that is... because my son because he’s a ‘sickler’, and because all of a sudden, he just doesn’t look well, kind of a high fever. The time we are running up and down to hospital, uh go and look for blood.... he’s dead! Just like that. Just like that! We lost him, so I don’t want to receive my children pass forward this experience, no it’s not good. We have just to suffer, the person” (P18)*

A study by Wonkam *et al* (2013) on Cameroonian adults with SCD showed how 40.9% of participants would consider medical termination of pregnancy for affected fetuses based on their perception of the future well-being and poor HRQL of the child, further illustrating this point. Hershberger *et al* (2015) showed 78% of participants would rethink parenting plans when knowing their child has a risk to have SCD. All participants in the same study described thoughts on having an affected child using phrases such as “hard”, “scared”, “challenging” and variations thereof, most often due to their own experience of pain, difficulty in medical management, hampering of social functioning and fear of early death (discussed further in 3.9.2).

On the opposite side, two of the 18 participants noted how they wouldn’t mind having a child with condition due to them having knowledge on how to cope which could then be relayed to their child. The perceived ability to cope or deal with an affected child was also seen in the Hershberger *et al* (2015) study, with 10% of participants feeling they would be able to overcome perceived challenges:

*“Um, I think it will be fine because I know how it feels to have the disease, so I’ll let my child have a normal life, but obviously I understand how it is having this sickness so it*

*won't, it won't be such a train smash, cause my child has someone who understands what they're going through.” (P8)*

*“Yes, I've thought about it but then I'm not really worried about it cause I myself I know what happens so I will believe that I will be able to help the child in anything if they was to have sickle cell.” (P16)*

The two opinions regarding not being too concerned with having affected children is interesting considering participant 8 having previously spoken about how SCD had negatively impacted aspects of her life, including social isolation and concerns regarding how her health will impact higher education and employment. It is possible that since participant 8 still lives at home that much of the perceived negative aspects of SCD are related to lack of or fear of lack of independence and that she may not have perceived her situation as negative in its entirety.

Participant 16 also described how he worried about future education and employment opportunities, however overall had a positive outlook on life. He spoke about being empowered around knowing how to manage and cope with his condition. His positive coping mechanisms and attitude may contribute to a better perception of his overall HRQL.

Of the 18 participants only one had made it clear that he wasn't aware of the fact that he could himself have a child with SCD:

*P17: “So you want to tell me if I'm have, that child it can be the same sickness like me?”*

*Interviewer: “Has anybody ever explained to you the sickle cell and how it happens?”*

*P17: “[Yes], there's someone who was explaining here but I was not understanding.”*

This participant became concerned after the question and was subsequently given genetic counselling after the interview to further explain his risks. It can be noted however that he had previously been counselled although may not have remembered the information. This participant's uncertainty with reproductive risks brings to light that potential re-counselling of patients may be necessary, especially when of child-bearing age. First genetic counselling sessions may contain substantial amounts of information which can be easily forgotten by patients. Language barriers may also be an obstacle to participants ability to completely understand all the information, highlighting need for translational support.

### 3.9.2 “Life-span” in SCD

Living with SCD can cause much stress for adults as they worry about their health and their future. Participants explained how one of their biggest concerns was around dying earlier due their condition. Participant 11 illustrated this when he expressed genuine concern that every episode of illness or hospital admission may be his last day alive:

*“That I’m going to die one day, if I’m at the hospital and I’m too sick.” (P11)*

Participant 10 also expressed fear around his own mortality as he is the same age as his father was when he died from SCD:

*“Um, that I won’t live to the age of, kind of, like my dad died when he was like 35, so I’m afraid that I won’t push it to that limit, because I, the doctors, my previous doctor, before Dr X said ‘With sickle cells as older you grow, the weaker your heart kind of gets’ So it’s kind of, that worries me a little bit, so I’m 35, is it my time to go or am I still [going to] carry on? That’s my only fear. Is this heart on the way out?” (P10)*

Another participant was told by doctors in his home country (DRC) that he would die at the age of 18 years:

*“But as they say ‘when they are going to be 18 they are going to die’. My mother she was worrying about that age. Exactly when I was 18, I get sick, that time, Very sick! Like someone want to die.” ...“Even if I just, I was not happy to, I would normally, when I realised, I heard that they say, then I know, I knew then I’m going to die.” (P13)*

Fear of death and conversations around death seemed to be quite common with many participants discussing the “life-span” of SCD and about dying from SCD complications as illustrated below:

*“...I just felt maybe like, I didn’t really, I just knew it was a normal sickness but then I was afraid because I thought maybe I was [going to] die sooner.” (P15)*

*“I think that’s how I’m going to die, is getting a heart attack” ... “and, it’s, it’s almost like a ticking time telling you ‘ok one day this is going to happen’.” (P6)*

*“My kidneys that fail, my heart can go dead. I’m scared for that.” (P9)*

These study results were similar to those from a study by Booker *et al* (2006) where they actually wanted to study pain experiences but found that fear was a recurrently emerging theme, especially

around loss of life or early death. Previous experience with individuals with SCD seemed to have an impact as was illustrated by participant 18. He has known many people with SCD and noted how they had not managed to live long lives, of which concerns him:

*“Because it’s not everyone that had the sickle that survived. Most of the people die, cause in my family there’s a how, we’re about five, but uh from my mother’s womb two is dead, I just remember one the last born. Others are not with sickle they are AS, and other one is SS. The other of my, uncle has a twin, twins but one died, one with the sickle” (P18)*

*“You know maybe they were kind of a I will not reach 40 years so say maybe 38 years, that is the lifespan of a sickle...” (P18)*

This theme, along with previous themes, brought to light the significance of negative feelings participants have about living with the painful and unpredictable nature of clinical events in SCD. Coping with the nature of SCD was seen to be difficult for many, impacting on relationships and education and employment opportunities and causing stress around early death. Always being sick led certain participants to feel that there wasn’t much good in having SCD which was further reflected when they spoke of how they would not want the same lives for their children. This said, two participants didn’t express concern around having children with SCD and may be due to their coping styles and experiences of living with the condition. Effective coping and management strategies are important for adults living with chronic disease in improving well-being and HRQL (Atkin & Ahmad, 2001). Healthcare professionals need to address the psychosocial needs of patients in relation to negative perception on how they feel their health affects their well-being and functioning, making appropriate referral to mental health or social support services if necessary (Weil, 2000).

### **3.10 Theme 5 - Coping and management**

Having seen the significance of the negative physical, psychological and social impact SCD can have on adult life, as discussed in preceding themes, it is important to understand if and how participants cope with daily living. As people with SCD are living longer lives so comes an increased need for self-efficacy and improved coping skills whereby patients care for themselves not only from a medical perspective but from a psychological, social and spiritual perspective too (Adegbola, 2011).

Participants in this study described using various coping strategies such as spirituality, support systems, adjustment and acceptance, empowerment through medical management to cope with

living with a chronic disease. These coping strategies were described to be of help in dealing with various circumstances and in living a more 'normal' life. Research suggests that the way in which people cope with and the resources available for living with the debilitating consequences of SCD can significantly alter ones HRQL (Adzika *et al.*, 2017; Beresford, Sloper, Baldwin, & Newman, 1996). Important coping strategies and resources include seeking timeous medical care, religious beliefs and family and social support systems (Adzika *et al.*, 2017). Effective coping strategies can allow patients to feel 'normal' and to try live as best a life possible amidst challenges faced in light of their health and adversity (Anderson & Asnani, 2013; Atkin & Ahmed, 2001).

### **3.10.1 Acceptance, adjustment, empowerment and hope**

This sub-theme emerged mainly from the question around "*what good has come from knowing your diagnosis?*". This was originally thought to be an odd question by participants, however it led them to realise the steps they take daily to cope with and manage their own health and circumstances. These include adjusting mind sets and lifestyle, accepting their situation and living with hope for something better.

One participant explained how "*sacrifices sometimes when you are sick are meant to be made*" (P10), referring to how he has had to "*slow down all the fun things*" (P10). Although he initially thought this to be a negative in his life he realised how changing his lifestyle helped him to be stronger and healthier for himself and his family, which he now sees as a positive. Other participants spoke of how they "*just don't think about it*" (P11), or how they have just learnt to accept their condition as a way of coping:

*"I didn't understand what was going on so everyone had to explain to me, like [yes] this is what... and I accepted it but then, [yes] there's nothing I can do."* (p15)

For some, living with SCD has become a "*normal thing*" (P12) in their life, as they have been living with it their whole life. Participant 18's description of how it is his "*cross to carry*" (P18) illustrates a form of acceptance of his situation. Acceptance as a form of coping was further seen when participants tried to normalise their condition by explaining how it's not as bad as other conditions. Interesting participants compared their condition to Human Immunodeficiency Virus (HIV):

*"... I know then I'm sick. And the doctor say it can't change it's the nature. But there's a difference between HIV and Sickle cell. Because HIV you find in this world, but sickle cell I just born like this. I have to try to avoid to be sick, only, to get the problem."* (P13)

*“...It’s more preferable to compare with other sickness like disease like eh cancer or this, ‘sickler’ is more better because it’s not, it’s a sickle cell disease its disease because of it’s in the blood. Now it’s doesn’t, it’s not that you will die as a cancer patient anything can, it’s a 50/50 chances or HIV no... you understand, it’s not like cancer, cancer you’ll be but even you may die. Maybe you taking the [chemotherapy] or whatever maybe you are not sure [chemotherapy] will work cause you see anything can happen because I see a lot of people with cancer in my family that died! You understand that so sickle cell still have chances to live.” (P18)*

*“It’s normal for me like other patients they’re worse they get, like blood and stuff.” (P7)*

These findings were similar to Atkin & Ahmad (2001) in where participants compared themselves to other people with chronic conditions in order to gain a sense of normalcy. In the case of not being able to accept one’s situation, some relied on hope in that maybe there is “[going to] be a cure or something else” (P2) or that “maybe they can find something, maybe they can change my blood” (P5).

Effectively coping requires certain psychological and physical adjustments (Treadwell *et al.*, 2014). If one cannot alter or adjust one’s situation then acceptance may assist in the coping process (Anderson & Asnani, 2013), as participants have illustrated. Participants also spoke of other coping and management techniques that include avoiding activities or situations that they understand will make them sick, or by engaging in health promoting behaviours. Participants explained how they have learnt to “prevent being sick all the time” (P1). This empowers them to have a sense of control over their condition, allowing them to better accept and adjust to their circumstances. Participant 1 was particularly vocal on how little things such as taking medication regularly and being sensible with regards to dressing and eating is helpful:

*“Like, proper care, like looking after myself properly like taking my medication without skipping any day”... “Ok, so I’m always taking a lot of water, after I wake up, before I go to bed, before meal, after any meal generally...”...”Yes, and when I’m cold I should always dress properly.” (P1)*

*“It does help me to reduce the risk of always falling sick. Because I know what to do and what not to do, I know what to eat and what not to eat, most times”... “I had to be on regular check up in the hospital to give us lectures on how to keep safe on at home and in just situations, so those regular check-ups help us to know and to educate us on what we are suffering from and how to manage it so.” (P1)*

Participant 10 explained that to have control over his health he plans ahead by putting preventative and emergency care measures in place:

*“I’ve [got to] make sure ok, this is what I need to take, this is what I need to do and this is how I, how can I say, prevent myself from actually getting sick or weak, on this particular day.” (P10)*

*“I like to tell people ‘ok, if this what happens, if I collapse, at this particular moment and I’m dehydrated, just give me water, put me in a cool area for me to at least get oxygen through my system then I’ll be fine, but if you see its too serious, call 911!’ I’ve got the number, I know the number in my head, and I can call my doctor right away and then they’ll just, [yes] they will come. So, I’m really organised.” (P10)*

Obtaining medical check-ups and treatments were also described as an important management tool to avoid getting sick:

*“I have to remember the date of my check up to make sure I will not enter into crisis” ...I have to come and check-up. I like to take this blood now, because this blood helps a lot! As a ‘sickle’ it helps.” (P18)*

*“... always follow your medication, things will be better for me.” (P2)*

One participant (P4) explained how maybe she would have preferred to not know the extent of her condition:

*“In the sense that like for example the moment you know you’re suffering from cancer, you know it’s, it speeds up you understand? Of which if you don’t know, things are pretty cool.”*

*“Yes it’s not deadly to that extent, but yeah probably there’s a life span or, you know, there’s a lot, but it’s kind of like I realised that part, the knowing part of which I could’ve just continued without knowing and make sure all doctors keep it a secret. ‘no you’ll be fine it’s just pain and- ‘you know?’” (P4)*

Participant 4’s quotes may allude to how much having SCD and the perceived related stressors weigh on participants mind, further supporting the psychological impact having SCD can have on adults. This said she does note that *“not knowing, is also dangerous”* (P4) because you can’t be prepared for *“what hits you each and every time”*, and so could inhibit obtaining adequate and timeous treatment causing participants to lose a sense of control over their health.

### 3.10.2 Spirituality and support systems

Participants discussed that spirituality and family support systems were their major coping resources. Family and friendship support systems were seen to play an important role in allowing those with SCD to feel cared for and improve overall psychological well-being. Spirituality was also seen to help participants deal with the uncertainty around their condition and what it meant for their future. Participants described the importance of family as a source of support:

*“Because we as Africans have this strong belief when it comes to family that, no matter the situation or the complication you’re in, we are there.” (P10)*

*“And I was happy because when I was always in hospital I was not alone, my family were always around me. They were always, and I could not feel so lonely in that sickness.” (P14)*

*“My mom and my dad. And now my wife is there for me...She does support me a lot, she does a lot for me. When I go into a crisis, or when I need some help with things, there’s sometimes I can’t walk. We have a chair like this...and if I do get a crisis in my leg or so on, and if it is bad, then she would move me on the chair, take me to the bathroom and into the bath, so.” (P6)*

This said some participants described not having adequate support systems to help them cope. Interestingly, all participants that spoke of not having support were migrants suggesting that there support systems may be back in their home countries:

Interviewer: *“Who’s your support system, who’s there for you when you need people?”*

P13: *“No one, myself.”*

One participant spoke of how it may help to start a support group for adults living with SCD. He himself is a migrant and this may be a valuable resource for those who have immigrated and do not have family structure or support systems available in South Africa:

P16: *“[Yes] I was actually thinking about that I was actually planning on speaking to my doctor cause I actually [want to] join a [support] group or something that would help me tell people even young kids about that. I actually [want to] do that.”*

Interviewer: *“So do you want to educate everybody else or do you want it for each other’s support system, or both?”*

P16: *“Both, both yes, anyway I can help I’m actually willing to help and everything.”*

Apart from family support being important, religious beliefs and spirituality was also highlighted as

an important aspect of participants lives, helping them to make sense of their realities and allowing them to cope:

*“... with the help of God, that’s the most important thing, if God is on your side, you are just living by his grace. Because it’s not everyone that had the sickle that survived. Most of the people die...” (P18)*

*“Maybe one day it will change because so many people, this thing change miraculously, do you believe? It change! From SS to AA. God change it!”....”God just waiting for me, waiting the day it will be a big testimony for my family because it will make it will bring others don’t know to God, very, to know God... Because I see others testifying in the church, they went to change SS into AA, they’re not a sickle here.” (P18)*

The above quote highlights how spirituality and hope can interplay to allow participants to cope more effectively with the uncertainty that is their health and is supported by research conducted by Cotton *et al* (2006). Cotton *et al* (2006) showed that a large majority of participants with SCD used religion, spirituality and prayer to help find meaning and peace in their lives. They also reported 35% of participants praying daily for relief from symptoms, in the hope of finding comfort from faith.

Spirituality has long been an established factor contributing to coping with the difficulties of chronic diseases and improving QOL (Adegbola, 2011; Adzika *et al.*, 2017), with a large proportion of Africans being religious. Spirituality revolves around personal beliefs and allows one to connect aspects of their human self and their health. For those that tend to be highly spiritual by culture, spiritual care can be a beneficial and valuable resource to help them cope (Adzika *et al.*, 2017; Adegbola, 2011).

As has been previously reported in studies looking at HRQL in SCD (Anderson & Asnani, 2013; Atkin & Ahmad, 2001; Treadwell *et al.*, 2015), three participants discussed positive aspects of living with SCD. Reporting on positive aspects whilst downplaying the negative aspects of living with a chronic condition is known as positive framing (Hill *et al.*, 2003). Positive framing can be a valuable coping mechanism allowing one to maintain a sense of control over their illness (Atkin & Ahmad, 2001):

*“But it also, it humbled me in the sense where I know that anything can happen to you. And, you and get a crisis you can end up in hospital, you can actually die.” (P6)*

*“... I think I’m more compassionate towards people, with, with um adversities, so I think I understand more, it doesn’t have to be someone with a disease maybe someone with a problem, I understand more because I know what it feels like to be in a situation where you’re undermined or you feel, or you feel scared of trying new things because of your circumstances so, [yes] I think that’s the positive thing that came out of it.” (P8)*

*“...it helped me a lot like knowing what, what, not just myself but what other people also go through, like I know now how to treat people better cause like when I come here at the clinic I see someone else who has sickle cell anaemia, like the last time when I was volunteering here I actually spoke to someone like giving the person encouragement and stuff, so it’s actually a good thing me knowing what I’m suffering from and how I can help.” (P16)*

Because living with a chronic condition hold much uncertainty for the future, patients need continuous support to cope with and manage the negative impact their condition can have on various domains of HRQL (Anderson & Asnani, 2013; Atkin & Ahmed, 2001).

Healthcare professionals, such as genetic counsellors, can benefit from understanding various coping strategies used by patients in that they can adequately individualise this information when counselling patients on how to find ways to be self-efficient in management of their health and well-being. Self-management programmes including social support and those promoting efficient self-care are seen to improve health outcomes and HRQL (Treadwell *et al.*, 2014). Since one of the key roles of a genetic counsellor is understanding how patients are coping, by exploring support systems and management strategies, there is a role for genetic counsellors to address these needs with patients. Anie & Green (2015) highlights a need for family and patient education and behavioural therapy to improve understanding, attitudes and coping.

Support groups might also prove a useful intervention to assist patients in coping with SCD on a long-term basis (Adewoyin, 2015; Weil, 2000). This said there are currently no support groups for people or families affected with SCD, highlighting a gap in the medical care of patients with SCD in South Africa that should be addressed.

### **3.11 Theme 6 - Healthcare**

Due to the chronic and variable nature of SCD and the severity of associated health outcomes, it is known that access to and quality of healthcare largely influences patients’ health and well-being (Telfair *et al.*, 2003). Participants perceptions and discussions around healthcare and their ability to access healthcare illustrated how this can affect overall HRQL, with better medical care leading to

improved HRQL. When migrants discussed the differences in healthcare in South Africa versus back home it further supported how access to and quality of care can impact well-being and HRQL. Quality of healthcare can be viewed as another differential aspect of how environment impacts on perceived HRQL (discussed in theme 2).

### 3.11.1 Access to healthcare

Participants explained how they felt it isn't always easy to access medical care when it is needed. This includes emergency care as well as regular follow up appointments at Groote Schuur Hospital. Barriers mentioned that impacted on access to healthcare included availability of transport, geographical location and socio-economic circumstances. Participant 10 described how he is grateful not to have children with SCD as this would require additional travelling to receive medical care. He already travels far distances for his own appointments of which he notes costs him a lot of money:

*“So, we both are lucky to have children who are not sick, if I can put it that way, cause if we could, its, where we are, money's wise, is oooh its difficult, especially the trips, because I stay in Simonstown [a town roughly 40km/17 miles from Groote Schuur Hospital].” (P10)*

The same participant, P10, knows that his medical follow ups are important but due to travel distances and costs he will sometimes skips appointments and sacrifice medical follow-up and obtaining medication:

*“...so that's why if I have an appointment, maybe I had an appointment on the 11 of October, couldn't make it because... no transportation, so it kind of, kind of, so I tell myself you know what, it's [going to] be very difficult just to go every month so maybe I can skip one, and then make sure if I skip one then I call and I say 'Dr X, I'm away on a school trip, or I'm away for the family or something.'” (P10)*

Although cost and distance was discussed as one of the main barriers to accessing care, pain crises and their impact were another. Participant 6 illustrated this by describing how he is unable to drive himself to receive care due to the severity of the pain crises. This further illustrates the pervasiveness of the problem of “pain” as described in theme 1:

*“But the crisis is very bad because imagine you're in pain, your leg, your both your legs, sometimes both my legs, now you need to drive. I can't obviously drive because I'm in pain so my dad or my wife needs to bring me”... “and the drive here is LONG and there's bumps and stuff so it is difficult.” (P6)*

Two participants explained how they face barriers to accessing healthcare when the ambulance or emergency medical transport takes lengthy periods of time to arrive once requested and that “sometimes they don’t show up at all” (P8):

*P2: “Then I got joint pains and sometimes when I call the ambulance it doesn’t come. Then I have to come here. It’s hard.” (P2)*

Interviewer: “Ok. And they don’t, how often do they not come?”

*P2: “Um, almost, sometimes they come after like uh five hours. When you call them when you have crisis twelve midnight they come in the morning.”*

*“Um, sometimes it’s difficult because when we call the ambulance they take really, really long to come. And then, um cause my mom doesn’t really drive so we have to depend on my sister, so she has to take us with the car sometimes.” (P8)*

The barriers described above result in difficulty accessing healthcare resulting in patients not receiving medications that are vital for preventing crises and other health complications associated with SCD. They were also seen to have trouble receiving timely and adequate emergency care that could have significant adverse health outcomes. Since easy and timely access to quality healthcare facilities and medication can significantly improve one’s HRQL (Telfair *et al.*, 2003), participants may have reduced HRQL due these barriers.

### **3.11.2 Healthcare in South Africa vs outside of South Africa**

In Africa, a handful of studies have reported on the quality of healthcare and healthcare facilities for patients with SCD (Brown, 2010; Dennis-Antwi, Dyson, & Frempong, 2008; Treadwell *et al.*, 2015; Wonkam *et al.*, 2012; Wonkam *et al.*, 2014b). To the best of our knowledge a comparison of how migrants perceived healthcare in South Africa versus the healthcare they received in their home countries has not been reported, indicating that this is novel data on this topic. All migrant participants that did speak of how the health systems differ in South Africa versus back home reported that the care in South Africa was superior, often resulting in perceived improvement in well-being and physical health.

With regards to the healthcare in Africa, participant 1 spoke of how he perceives the commonality of SCD in Africa to be the reason for sub-par medical care:

*“The care I got here is better, they treat me nicely and they are more attentive in this place. In Nigeria they normal about it cause its common, it’s a common disease in West Africa but*

*since the population of the sickle cell suffers they don't give you much attention cause there are other people to look at.” (P1)*

Other participants spoke of how they have seen significant health improvements since moving to SA and receiving care here, illustrated by participant 17 who said, *“I'm feeling better now”* (P17) than he did in the DRC. Some even explained how they weren't sure if they would survive, with SCD, in their home countries due to inadequacies in the healthcare systems. Participant 18 illustrated this when he described how he survived *“by the grace of God”*, rather than by receiving adequate treatment:

*“No here its perfect, because I'm telling the truth because in Nigeria, that was where I was there... in fact it's just like I'm living by the grace of God because the way, the way at the time now they were looking for blood they will see blood, they say I have to call my relatives, to take blood. I know in Nigeria it's not like, it's not like can survive compared to South Africa because Nigeria, here, people are free to donate blood, if you are the fear it's kind of a to help people, to help those to live, you understand the fear it's kind of a enjoyment it's kind of a kind of a... but it's not like in Nigeria, Nigeria we are... it's too late to go and donate blood. They say it's how much are you [going to] pay him or her you understand?... it's not easy for a sickle to survive.” (P18)*

Participant 18 illustrated a healthcare dilemma present in SSA, whereby there are persistent shortages of blood donations. Patients may have to rely on family donors; however, this is limiting in that matched donors are needed, or on voluntary blood donations from non-family members but these are also limited in SSA. Due to increased poverty and need for blood, people donate blood in exchange for financial gain. This resulted in increased costs for hospitals and patients as well as decreased voluntary blood donations, further adding to the crisis of blood shortages in SSA (Aneke & Okocha, 2017).

Lack of adequate medication and the consequences thereof was further illustrated by participant 14 where she explained how in the DRC *“if you just look at the sickle cell child you will know that this child is sick”* and this is because *“medicine is not like here in South Africa”*, further indicating how participants felt healthcare in SA supersedes that in most of Africa:

*“But it very difficult in South Africa you to notice that this person is sickle cell if they don't tell you. Because here other people when I tell them that I'm sickle cell they say "What?!!" and I say: "Yes I am" they just "What!? how?".” (P14)*

Participants illustrated further how the poor facilities and high costs of treatment outside of South Africa affected their ability to always receive adequate care and again caused stress around dying from SCD complications. This highlighted how South Africa is better in providing overall healthcare to patients with SCD in that government healthcare is free or more affordable for those in poorer socio-economic circumstances:

*“So far in Nigeria there is no more, there’s no more medication. Or good facilities there. Because if you want to go to the hospital, you have to pay for more money and I don’t have any money.” (P5)*

*“Um, Congolese people think sickle cell is a disease you’re [going to] die from because in Congo its poor health facilities and stuff, but here its different.”...“Yes, here its better compared to there cause when you in hospital you have to pay, you have to pay for everything, for the day you spend there for the medication, for the drip, everything, so here it’s much better. Cause if you don’t have money then you can’t go to the hospital they’re not going to help you, but here you can come anytime.” (P11)*

*“It was actually poor compared to here because back there [Kenya] the medication is actually very expensive, so I wasn’t getting the medication like each and every day I was getting it like maybe a week of treatment like twice or three times, so I was very like very weak back then but once I came here it’s totally different, it’s like affordable.” (P15)*

One participant explained further how due to high costs of healthcare in Africa only the “privileged” (P4) would be able to afford it:

*P4: “I was recently in [Zimbabwe] last year, in December I went for holiday. And I ran out of my hydroxyurea. And then when I worked, I had to see one of the doctors, they gave me a prescription and stuff... holy cow, it was four times...”...“Unaffordable, but the fact that I had to have those, like flip, you finally need to buy them. And then I ended up buying them. So, it was something that I actually feel sorry for those sickle patients in [Zimbabwe] right now, if they are not that privileged, then it’s something else.” (P4)*

Some participants even described having emigrated to South Africa purely in the pursuit of better healthcare for their condition. This further highlights the inadequacies in healthcare in various African countries, outside of South Africa:

*“The main reason why I moved here it’s because of my health. {Yes} because they say being here, compared to there like its known it’s better to be treated here. So that was actually my main reason moving here, it’s because of my health.” (P15)*

Better care for patients living with SCD in South Africa can help patients avoid the stigma that may come with people identifying them as sick due to physical appearance. This in turn can allow for patients to disclose status at their own will and may improve certain aspects of HRQL including the way others treat them, as discussed in theme 3.

One participant experienced medical neglect in his home country where he sought medical treatment for priapism and was subsequently treated inappropriately which will affect his sex life going forward:

*“Even if I’m not doing anything, pain and then one day I was sleeping found like, this, not to sleep only to find like a ruler and when I go back to they send me to hospital, they didn’t give me any tests or anything only operation, they cut my penis like a fish” ... “no, yeah they just kinds of cut it you know and then its soft, sometimes its erected but no strong like it used to be.” (P13)*

The above issues raised by participants bring to light the fact that even in countries where SCD is so prevalent medical interventions and knowledge are lacking for appropriate treatment of patients. This is in agreement with previous studies done to look at healthcare for patients with SCD in Africa, and further supports how poor healthcare in Africa is an urgent problem that needs to be addressed (Dennis-Antwi, Dyson, & Frempong, 2008).

Understanding patient perceptions regarding healthcare is important in understanding how medical services could be improved. Ultimately the goal of healthcare is to treat and manage patients’ health whilst trying to ensure a better HRQL. Findings from this study have supported previous reports on how access to healthcare can prove difficult for participants as well as how healthcare for individuals with SCD is poorly lacking in Africa. Findings also showed how many participants are satisfied with the general care they receive at Groote Schuur Hospital but have mentioned aspects of the healthcare system that can be improved (data not shown). This knowledge is valuable in allowing healthcare professionals to better understand where the shortfalls in the medical system are and to aim to implement changes best suited to the complex needs of patients with SCD.

### **3.12 Chapter summary**

This chapter outlined the research objectives and how they were achieved. The themes emerging from the data were discussed. Discussions around emerging themes included the impact of incessant pain and illness, environment, and health-related discrimination and stigma and how this was perceived to mainly negatively impact on HRQL. Participants also spoke of self-management and coping strategies that assisted them with living with SCD into adulthood. Perceptions on healthcare both within and outside of South Africa were also illustrated and this serves in part as novel information with regards to impact on healthcare on HRQL and to illustrate a broad overview of how healthcare for SCD is lacking in certain African countries.

## **CHAPTER 4: CONCLUSIONS, STRENGTHS AND LIMITATIONS OF THIS STUDY AND RECOMMENDATIONS FOR FUTURE RESEARCH**

### **4.1 Chapter Overview**

The concluding chapter of this study will summarise the relevant findings from this research. The strengths and limitations will also be outlined along with suggestions for future research.

### **4.2 Conclusions**

This study aimed to explore the experiences of how living with SCD has impacted on QOL in a select group of adults with SCD, in Cape Town. By exploring how SCD is perceived to impact on the HRQL of these adults, healthcare professionals can better understand their patients' needs and provide more suitable therapeutic and support options relevant to their patients. Findings can also assist in determining how genetic counselling services may be tailored to needs of patients with SCD. Eighteen participants living in Cape Town with SCD were interviewed. These interviews were transcribed by the main researcher and then analysed using the framework approach and thematic content analysis. This allowed for the six themes that were developed to be done so in line with the research objectives.

The first theme outlined the constant and unpredictable nature of pain and other SCD-related health complications experienced by adult study participants. Constant and/or unpredictable episodes of pain and illness make achieving academically challenging for many with SCD. Participants explained how education and employment opportunities or ability to achieve in these spheres was often affected by their health. This in turn affected financial status, relationships and overall positive perceptions regarding the future and ability to achieve. Pain and its consequences, overall negative feelings around having SCD and poor coping abilities led to participants feeling

misunderstood, over-protected and isolated all of which affects relationships including those of a social, family and personal nature. The effects on adult functioning left participants feeling limited in adult life and frustrated with not being able to live a normal life. Overall the psychosocial impact of living with SCD was described by participants as mainly negative. Healthcare professionals can benefit from understanding the significance of the perceived negative effects of pain and other reported health complications on the HRQL in individuals with SCD. They can use this information to implement more appropriate healthcare interventions, aimed at managing the complexities of health issues in SCD, with the main aim of preventing and/or managing pain and therefore improving HRQL. There is also a need for psychosocial support to assist patients in dealing with the negative psychological and social implications of living with a chronic condition. There is room for social worker intervention, but the socio-economic status of SA along with participant citizen status makes this challenging.

The second theme illustrated how various environmental factors influence the health of adults living with SCD. It was found that temperature extremes, too much physical activity and poor mental state all resulted in worsening health with pain crises being a main consequence. Inadequate diet or nutrition, of which was attributed to poor socio-economic status, also lead to poorer health outcomes and perceived HRQL in participants. Many participants were however aware of how various environmental factors affected their health, and if possible, this allowed them to implement precautionary measures to avoid negative health outcomes. There is further room for genetic counsellors and treating physicians to educate/counsel patients on minimising precipitating environmental factors as to try and avoid pain and other health complications. At the same time, there is room to address patients' additional psychological or psychosocial needs, making referrals where appropriate.

The third theme brought to light how adults with SCD are often subject to health-related stigma and discrimination and how it is perceived by participants to affect various aspects of adult life including employment opportunities, self-esteem, social, personal and family relationships. Effects on relationships were seen to impact mainly social but also sexual functioning. Participants described how they are often treated differently in various aspects of life leaving them feeling socially isolated, frustrated and emotionally affected. This health-related stigma and discrimination often led to avoidance of disclosing disease status even if it meant jeopardising their health. This theme indicated how significantly being treated differently, due to a condition, can affect participants' confidence, social functioning, employment opportunities, relationships and overall HRQL. There is an urgent need to educate the public and healthcare professionals about SCD as to lessen the stigma associated with the condition. There is a role for genetic counsellors to work

together with patients to find interventions that address and reduce stigmatisation or the guilt, shame or social isolation experienced around their condition. Even the action of the genetic counsellor providing an open and empathic approach to listening to patient's struggles can be, in itself, helpful and healing for patients.

In theme 4, many explained how due to the constant and unpredictable nature of pain and illness, the effects it has on everyday functioning and the many illness related stressors that come with having SCD that there is nothing good about having SCD. Due to their own experiences of living with this chronic condition, and the negative consequences it is perceived to have on their HRQL, most would not want children with the same condition. There is room in this regard for genetic counsellors to educate patients on reproductive risks and options. There is also a need to address anxiety and feelings around reproduction. Indirectly, speaking of feelings around having affected children alluded to how participants felt SCD affected their own HRQL, of which most participants illustrated negative perceptions. Two participants however didn't express the same concern around having affected children with this likely attributed to better coping styles and experiences of living with the condition. Patients would benefit from effective coping and management strategies as to improve their well-being and HRQL. Healthcare professionals, such as genetic counsellors, need to assess and address patients' psychosocial needs, coping strategies and support systems and decide if referral to appropriate mental health or social support services is needed.

Ultimately without a cure, participants will have to live with SCD for their whole lives. Living with a chronic condition brings on much uncertainty, therefore patients need continuous support to cope with and manage the negative physical and psychosocial implications and to live as normally as possible. Participants have therefore found several ways in which they cope with their condition as discussed in theme 5. Some participants turn to spirituality as a method of making sense of their reality and allowing better coping and adjustment. Others rely on family or social support systems to assist them in adjusting to and dealing with their health and needs, where others have found ways to adjust to their lifestyle and have accepted that this is way it will be. Acceptance of their condition and adjustment of lifestyle allows for participants to put management systems in place to have control over their health and ultimately a sense of empowerment over their condition, resulting in improved coping and overall HRQL. There is a role for genetic counsellors in exploring patients support systems and coping techniques and to help patients make use of resources that will benefit their psychological well-being. There is also room for a support group for adults with SCD with many patients being migrants, often having moved away from family or main social support systems.

Medical management and care is an important aspect of living with SCD and improving HRQL for participants. In theme 6 migrant participants spoke of the poor quality of healthcare back in their home countries indicating that there is an urgent need to review to medical systems in Africa, where SCD prevalence is highest. They also spoke of how their health has improved since moving to South Africa and receiving care here, further supporting what was seen regarding environment impacting on health and HRQL. These findings also highlight the importance of implementing adequate and tailored healthcare programmes to treat and manage complex conditions such as SCD.

#### **4.3 Strengths of this study**

- To the best of our knowledge, this study is the first study in South Africa to qualitatively explore the perceptions of HRQL of adults living with SCD.
- The interview guide was designed using open-ended questions so that it allowed participants to share their stories in an open manner, which in itself can be therapeutic to participants.
- The open-ended questions also allowed themes to be developed during the research process rather than going into the interviews with predetermined themes. This allowed for a more flexible approach in terms of understanding the impact SCD has specifically on patients in South Africa.
- In South Africa, the field of genetic counselling is still relatively small therefore this research is valuable in contributing to a better understanding of the impact of SCD on patients, allowing genetic counselling services to be tailored to specific needs of the patients.

#### **4.4 Limitations of this study**

- As this was the researchers first time doing qualitative research, it meant that the first interviews may not have been as well conducted as later ones. Although the purpose of this research was to introduce the researcher to qualitative research, this may have resulted in discrepancies between interviews.
- As stated in the inclusion criteria, all participants had to be English speaking to be included in the study. This said, English was not necessarily the native language of all participants meaning that the quality of data may have been affected in select interviews.

- Since the study participants were selected using purposive sampling, this can lead to ascertainment bias whereby the views and opinions of a broader community based sample were not explored. Such a sample may have revealed different issues around HRQL in SCD.
- Purposive sampling also lends itself to further bias whereby the opinions of those unwilling to participate were not included.
- The interviews were conducted at the SCD clinic itself and this may have led participants to feeling that certain answers could have influenced the care they receive at Groote Schuur Hospital. They may therefore not have so openly shared their full experiences or thoughts around what it means to live with SCD and how this impacts on their HRQL.

#### **4.5 Practical implications for this research**

Based on study findings the following recommendations can be made:

- The co-ordination and communication between the Haematology and Genetic units at Groote Schuur Hospital needs to remain ongoing to allow for all patients to have access to genetic counselling services. Follow-up counselling can also prove beneficial to patients planning families as this will allow for further communication around risks for offspring and to allow patients to make use of services for partner carrier testing.
- There is an urgent need to educate both the public and healthcare professionals both within Groote Schuur Hospital and outside of Groote Schuur Hospital about SCD. Education can help to minimise the stigma and discrimination experienced by patients within the employment and healthcare sectors as well as personal and social environments.
- Understanding how various environmental factors impact on patients' health and HRQL can allow healthcare professionals to advise patients on how to implement self-management programmes. This can inform participants on how to avoid certain precipitating factors that may result in worsening health and the need to seek treatment at medical facilities.
- Patient information sheets containing self-management information and contact details of supportive services need to be distributed to patients and translated into appropriate languages if feasible.

- Since many patients are immigrants and often don't have family or support systems in place in South Africa, a support group could provide access to a necessary resource for social support. Support groups are beneficial in that they allow a space for individuals with a condition to meet other people in similar situations where they can share stories, experiences and provide each other with advice and emotional support.
- It is important that both the haematologists and genetic healthcare professionals understand the impact SCD has on the lives of patients to be able to provide a holistic approach to medical care and adequate treatment and therapeutic, genetic counselling and support options relevant to their patients.

#### **4.6 Recommendations for future research:**

- Methods that assess HRQL in patients use already developed quantitative PRO tools. Of those existing tools, only a few have been adapted specifically to assess HRQL in SCD, however they have been adapted to populations in the USA and UK. Since there are no PRO HRQL tools adapted to African patients there is a need to do so. The qualitative exploration done in this study could allow emerging themes from the data to be used in future research to refine previously validated HRQL instruments, to achieve appropriateness and usefulness in African healthcare settings.
- Research that explores the knowledge of SCD among healthcare professionals both within and outside of Groote Schuur Hospital could prove valuable in understanding the need for increased education and support around SCD. This will assist in allowing healthcare professionals to be more cognisant of how to treat patients and to attend to their needs with urgency. It can also allow for healthcare professionals to know when to refer patients as necessary.

#### **4.7 Chapter summary**

In the concluding chapter of the study the research conclusions were presented along with the strengths and limitations of the study. Practical implications of the research as well as recommendations for future research were also discussed.

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## **APPENDICES**

### **APPENDIX A: PARTICIPANT INFORMATION SHEET AND CONSENT FORM**

MSc (Med) Genetic Counselling Research Project

#### **Perceptions of Health-Related Quality of Life among Adults living with Sickle Cell Disease in Cape Town, South Africa**

##### **PARTICIPANT INFORMATION SHEET**

###### **STATEMENT BY PARTICIPANT**

I, \_\_\_\_\_ confirm that:

- 1) I have been invited to be involved in the above mentioned research project which has been initiated through the division of Human Genetics at the University of Cape Town. I understand that 15-20 other adult participants will be involved in the study and that my name and other personal information will not be discussed with the other participants or with anyone else not involved in the study.
- 2) I understand that the objective of the study is to see how adults, in Cape Town, affected with sickle cell disease perceive their quality of life to be.
- 3) I understand that the interview will take place in a private setting at Groote Schuur Hospital (GSH) on the scheduled days of the adult sickle cell clinics. I understand the interviews will take approximately 30-45 minutes.
- 4) I understand that I voluntarily choose to participate in this study and if I choose to no longer continue that my decision will not in any way affect the health care services I currently receive at GSH.
- 5) I understand that the questions may cause emotional reactions and that I may choose not to answer any questions if I do not wish to do so. I understand that I may decide to stop with the interview process at any point if I feel uncomfortable or too emotional and that this will not impact on my medical care in any way.

- 6) I understand that my involvement in the study may contribute to health care professionals having a better understanding of the impact of sickle cell disease on patients in the South African public health care system. This information will assist health care professionals in understanding how various medical, counselling and therapeutic options can be adjusted accordingly to the needs of patients.
- 7) I understand that all information collected will remain confidential and will be used for research purposes only.
- 8) I understand that the interview will be recorded for research purposes. All audio recordings will be safely stored away in locked cupboards and information stored on a computer will only be accessible via a password. I understand that only the researcher, her supervisors and examiners will have access to the data. All recordings will be destroyed upon completion of this study and all identities will remain anonymous.
- 9) I understand that the interview will take place in English and that the researcher will be administering the interviews herself.
- 10) I understand that this study has been approved by the registered Human Research Ethics Committee at the Faculty of Health Sciences at the University of Cape Town. I have been given contact details should I wish to contact the committee about how I was treated as a research participant.
- 11) I have the researchers contact details in the event that I would like to contact her regarding further questions about this study.
- 12) \_\_\_\_\_ has explained the information of this study in English and I understand this information.

**PARTICIPANT CONSENT FORM**

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**I HEREBY DECLARE THAT I HAVE VOLUNTARILY AGREED TO PARTICIPATE IN THE ABOVE RESEARCH STUDY AND THAT THE INTERVIEW CAN BE AUDIO TAPED**

**Signed at:**

**(Address of venue).....on.....2016/2017**

.....

.....

**Participant`s name and signature**

**witness`s name and signature**

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If you have any questions regarding your rights as a research participant, please contact the Human Research Ethics Committee at the Faculty of Health Sciences of the University of Cape Town.

**Professor Marc Blockman** (Chairperson of the Human Research Ethics Committee):

Tel: 021 406 6496

If you have any questions regarding the research or the research procedure, please contact the researcher or her supervisor:

**Clair Ingram** (Researcher): Tel: 072 388 9586, email: [ingcla003@myuct.ac.za](mailto:ingcla003@myuct.ac.za)

**Professor Ambroise Wonkam** (Supervisor): Tel: 021 406 6307, email: [ambroise.wonkam@uct.ac.za](mailto:ambroise.wonkam@uct.ac.za)

## APPENDIX B: SOCIO-DEMOGRAPHIC FORM

### To be completed by the participant:

1) Name:

2) Age:

3) Gender (please tick): Male

Female

4) Ethnicity:

5) Home country:

6) Employment status (please tick): Employed

Unemployed

If employed, what work do you do?

7) Highest Education level (please tick): Primary school

High school

Tertiary education

None

### To be completed by the researcher:

8) Diagnosis:

## APPENDIX C: OPEN-ENDED INTERVIEW GUIDE

- 1) Tell me about yourself and what it has been like living with your condition
  - Age of diagnosis; age when you fully understood what was happening to you; how did this impact you?
  - Which physical activities do you struggle with the most? How has this impacted you?
  - Tell me if and how your health has affected your education/ employment
  - Do you not work because of your health? If yes, how do you feel about this?
  - What are your feelings about having children? Thoughts regarding having an affected child?
  
- 2) How do you feel about having to live with SCD?
  - Main concerns about living with SCD
  - Tell me if and how your independence been affected by your health?
  - Tell me about how you cope with these feelings
  
- 3) Tell me about your experience in accessing health care at the hospital; and about your experience of the care you receive at hospital.

How does it compare to your treatment in your home country (only applies to immigrants)?
  
- 4) Tell me about your support system?
  
- 5) Tell me about how the people in your family or community treat you because of your condition? How does you feel about this?
  
- 6) Tell me about what good has come from knowing your diagnosis?

## APPENDIX D: ETHICAL APPROVAL



UNIVERSITY OF CAPE TOWN  
Faculty of Health Sciences  
Human Research Ethics Committee



Room E53-46 Old Main Building  
Groote Schuur Hospital  
Observatory 7925  
Telephone [021] 406 6626  
Email: [shuretta.thomas@uct.ac.za](mailto:shuretta.thomas@uct.ac.za)

Website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms)

20 June 2016

**HREC REF: 370/2016**

**Prof A Wonkam**  
Human Genetics  
Falmouth Building

Dear Prof Wonkam

**PROJECT TITLE: PERCEPTIONS OF HEALTH RELATED QUALITY OF LIFE AMONG ADULTS LIVING WITH SICKLE CELL DISEASE IN CAPE TOWN, SOUTH AFRICA (MSc candidate- Ms C Ingram)**

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

**Approval is granted for one year until the 30<sup>th</sup> June 2017.**

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms))

**Please quote the HREC REF in all your correspondence.**

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval before the research may occur.

***The HREC acknowledge that the student, Clair Ingram will also be involved in this study.***

Yours sincerely

signature removed

**PROFESSOR M BLOCKMAN**  
**CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE**

Federal Wide Assurance Number: FWA00001637.

Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical

HREC 370/2016

Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2006), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines.

The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.