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Department of Statistics and Population Studies

Understanding the factors related to subjective well-being in the TB population: The South African perspective

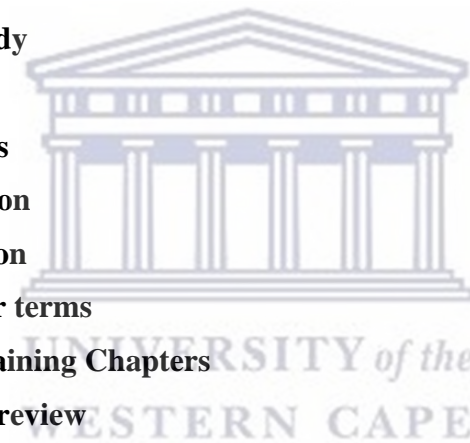| |
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Contents

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List of Figures and Tables

Figures

Tables

Abstract

Fifty percent of the world's tuberculosis population is found in eight countries, one of which is South Africa. Of the eight countries, South Africa is said to be experiencing the highest burden of Tuberculosis, with an estimated incidence of three hundred and twenty-two thousand cases of active Tuberculosis. The Tuberculosis epidemic is driven by the following reasons, firstly poor living conditions which are a result of the wide gap between the rich and the poverty-stricken among some populations, and secondly late presentation to health facilities. Over the years, healthcare programs have made a meaningful impact in identifying patients presenting for Tuberculosis care, a global Tuberculosis report shows an estimated fifty-eight million lives were saved through Tuberculosis treatment and diagnosis, between the years 2000 and 2018. However, strategies to modify risk behaviour need to remain a main priority. In the South African context, it would be important to note the diversity of the individuals experience which is rooted in South African socio-political history and has resulted in high levels of social inequality and disparate socio-economic status groups, as a significant factor when considering the well-being of Tuberculosis infected South Africans. For policy makers to make data-driven decisions, with the aim of lessening the disease burden experienced by the populations they serve. They would require insights from an individual level, this way of measuring well-being requires the participants to rely on their own cognitive judgements and emotional reactions to characterize their well-being. Alatartseva and Barysheva in 2015 claim that subjective well-being is an internal evaluation of well-being, relating to one's spiritual, personal characteristics and features. This approach is fitting since behavioural data is dynamic and relative as it tends to differ across populations and is often altered radically in short periods. Despite global advances in access to Tuberculosis treatment, Tuberculosis is the leading cause of death in adults with Human Immunodeficiency Virus and the main contributor to antimicrobial resistance. This gap can be bridged by an understanding of the behavioural aspects tied to Tuberculosis infection. There is a lack of adequate South African literature on Tuberculosis infection and health related well-being. The current study notes and compares, the diversity of life satisfaction experience between participants from different socio-demographic status groups across South Africa, bringing forth the most influential variables on well-being. This paper explored the possible factors of subjective well-being in the Tuberculosis infected South African population. Data from the National Income Dynamics Study 2017 was used, with a focus on the Tuberculosis diagnosed sub-population across all nine provinces in South Africa. The study sample consisted of forty-four individuals who were measured against the following

variables: age; gender; population group; place of residence in 1994; labour market participation, education; health; emotional health and well-being and social cohesion. The study employed, Multiple Correspondence Analysis to identify significant variables associated with the well-being of Tuberculosis infected individuals. The results show that the participants of African lineage presented with the lowest level of subjective well-being, followed by the Coloured population which was more likely to have a smoking habit to further decrease their level of well-being. Gender was a significant contributor to well-being with female participants reporting an overall lower level of subjective well-being compared to their male counterpart. Furthermore, those co-infected with Tuberculosis and Human immunodeficiency Virus while poverty-stricken presented with the lowest possible level as they are likely to be depressed, have a weakened immune system and experiencing medication non-adherence.

Key terms

Psycho-social factors

Health-related quality-of-life

Multiple-correspondence analysis

Life satisfaction scale

Psychometric assessment

Dedication

I dedicate this research to my loving brother and my sweet sister, who have supported me in pursuing a degree in higher education. I hope we can continue to be the dream team that our mother had envisioned, that we see education as the key to a better quality of life. My siblings have inspired and motivated me to remain committed to furthering my education.

Declaration

I, Motladi Mirriam Matatiele, hereby declare that this study entitled: "Understanding the factors related to subjective well-being in the TB population: The South African perspective" that is being submitted for the degree of Masters in the Department of Statistics and Population Studies at the University of the Western Cape has not been submitted before for any other degree or examination at any other university. It is my own and information from other sources has been acknowledged by means of appropriate references.

Motladi Matatiele   Date: 30 September 2020

Matiele.

Signature

Acknowledgment

In accomplishing this study and with all the supervision during this course of the study, my gratitude goes to my supervisor, Prof. Nancy Stiegler.

Acronyms/Abbreviations

TB	Tuberculosis
HRQoL	Health-Related Quality of life
UNAIDS	Joint United Nations Programme on HIV/AIDS
WHO	World Health Organization
HIV	Human immunodeficiency virus
AIDS	Acquired immune deficiency syndrome
NIDS	National Income Dynamics Survey
USAID	United States Agency for International Development
MCA	Multiple Correspondence Analysis
CA	Correspondence Analysis
ANC	African National Congress
HAND	HIV Associated Neurocognitive Disorders
CDC	Centers for Disease Control and Prevention
CVD	Cardiovascular Disease
COPD	Chronic Obstructive Pulmonary Disease
MDR (TB)	Multi-Drug Resistant (TB)
DM	Diabetes Mellitus
SSA	sub-Saharan Africa
SA	South Africa
DOTS	Direct Observed Therapy Short course
RSV	Respiratory Syncytial Virus
ART	Antiretroviral Therapy
UN-HABITAT	United Nations-HABITAT

Chapter One: Introduction

1.1.   Background to the Study

Tuberculosis (TB) is often referred to as the "disease of the poor" as it continues to be the largest contributor to mortality among infected people in developing countries (Mukadi, et al., 2001). This is because many studies have shown a strong correlation between an increased TB infection among individuals that live or work in overcrowded environments, those exposed to air pollution, poor nutrition, smoking, alcoholism, diabetes, and most importantly infected with Human immunodeficiency virus (HIV) (Abdool-Karim, 2004).

In the early 2000s, South Africa (SA) was reported as one of the sub-Saharan African (SSA) countries with the largest and fastest growing HIV epidemic (USAID, 2010). In present day about 7.7 million people are living with HIV in SA, with 240 000 newly infected people and 71 000 people who died from Acquired Immune Deficiency Syndrome (AIDS) related illness (USAID,2014). In 2009, 1.7 million deaths worldwide were TB related, ranking TB at 7th place on the list of leading causes of death globally (Barter, et al., 2012).

When the TB bacteria begins to grow in the lungs, it can cause symptoms such as a bad cough that lasts for three weeks or more, a sharp pain in the chest and coughing up of blood or sputum which is a mucus that originates from the lungs (CDC, 2019). These overarching symptoms can be accompanied by fatigue, weight loss, lack of appetite, fever and night sweats (CDC, 2019). By this we can see how TB is able to contribute to poverty through impacting an individual's physical well-being which directly implicates one's ability to work (Barter, et al., 2012).

Another factor to consider when evaluating the impact that TB could have on one's life is the cost incurred which can be indirect and may also relate to time. It is also important to note that most developing countries in Africa have a history of imposed economics which has left many systems in a dire condition.

In SA, Apartheid was a system of institutionalized racial segregation (Maillacheruvu & McDuff, 2014). Apartheid is an Afrikaans term which can be translated to mean "separateness". The system of Apartheid was characterized by repression which resulted in socio-economic inequality of respective population groups (Price, 1986). Under the Apartheid system, there was a removal of public healthcare which resulted in the expansion of private healthcare

(Maillacheruvu & McDuff, 2014). The private sector was naturally expensive, which was a strategy to perpetuate white supremacy, and to systematically separate and eradicate the more inferior underprivileged majority namely Asians, Coloureds and Blacks (Price, 1986).

April 1994 saw the dawn of a new era in SA, a national agenda was drafted by the African National Congress (ANC) which was the leading party at the time (Mash, et al., 2012). President Nelson Mandela announced that socio-economic and political integration are the most important items on the agenda (Maillacheruvu & McDuff, 2014). The post-apartheid government saw it fit to prioritize healthcare as an area for reform (Mash, et al., 2012).

It has been twenty-five years into the new SA; however, the economic legacy and social effects of apartheid continue to the present day (Maillacheruvu & McDuff, 2014). Many of the country's social institutions, such as healthcare services, continue to function as per-apartheid era, although public healthcare systems have been re-introduced, they remain unsatisfactory when compared to private healthcare facilities (Mash, et al., 2012). The public healthcare system in SA is overburdened with 30% of all SA physicians working in a public sector that serves over 80% of the county's population (Keeton, 2010). This proportion of the population caters to the non-white under privileged residents, who are forced to use public healthcare services which are largely under-funded and understaffed (Keeton, 2010).

An increase in healthcare resources would benefit the large number of patients on TB treatment as they are likely to come in on a weekly basis. This disease continues to rank high in SA due to lack of education, this is evident in the high rate of defaults as most patients don't complete their treatment (Department of Health, 2004). The patients that default not only contribute to a vicious cycle of burden on the public healthcare system but are at risk of developing multi-drug resistance which can make their condition even harder to treat (Department of Health, 2004). The need to understand the well-being and impact of disease on the quality of life of individuals with TB infection is seen in both developed and developing countries. However, it is more important to remember that SSA is home to the larger proportion of this population.

The first point in the World Health Organization (WHO) constitution reads: "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (Word Health Organization, 2020). The primary appearance of well-being can be found in the work of Jahoda (1958), where the author uses the term to describe positive psychological health. This research later gives rise to studies on quality of life, life satisfaction,

standard of life and health (Savahl, et al., 2014). The findings are enough to establish a trajectory of well-being in the health sciences.

The concept of well-being shows up again during the social indicator movement of the 1960's. One of the earlier findings date back to 1966, in a publication measuring the well-being and quality of life of American citizens (Bauer, 1966). In the present day, the field of monitoring and measuring well-being, life satisfaction and quality of life has evolved into two major streams, namely objective and subjective well-being indicators (Land, 2007).

The Merriam-Webster dictionary defines objective as expressing or dealing with facts or conditions as perceived without distortion by personal feelings, prejudices, or interpretations. It is limited to choices of fixed alternatives and reducing subjective factors to a minimum (Merriam-Webster.com, 2020). Merriam-Webster goes on to relate subjective to the essential being of that which has substance, qualities, attributes, or relations. Additionally, relating to an experience or knowledge as conditioned by personal mental characteristics or state (MerriamWebster.com, 2020). This description justifies the association of objective indicators to key national indicators which have been designed to measure a range of predetermined objective standards. Furthermore, subjective indicators refer to indicators that reflect an individual's perception of their own life which can offer healthcare providers with more detailed insight as TB is closely related to an individual's behavioural patterns.

There are two main assumptions to consider when analysing subjective questions (Neff, 2007). The first is that individuals can evaluate their own conditions, the second is that responses should be comparable across individuals (Ferrer-I-Carbonell, 2002). These assumptions are based on the idea that individuals are able to provide a reliable self-evaluation. Veenhoven (2000) maintains that good and bad feelings are universally recognised in the same way. That all humans can reflect on an event and articulate how the experience made them feel. However, subjective appraisal is relative, between persons there could be different understandings of the same rating scale. In economics they refer to this phenomenon as the 'theorem of incomparable utilities' which suggests that an individual that reports to be 'very satisfied' could possibly be equally as happy as the individual that reported 'satisfied' (Neff, 2007). This begs the question: what if a previously disadvantaged TB infected individual can adjust to their living conditions and be satisfied.

The best way to investigate the well-being of TB infected patients, is to consider culturally appropriate and adequately standardized measures. The previously disadvantaged SA has a long

history of exposure to political violence, oppression, abuse, and affliction. Research shows that an individual's socio-economic status is closely related to their health, cognitive state, educational attainment, socio-emotional development and access to resources (Bradley & Corwyn, 2002). This list of characteristics provides a snapshot of the complexity that can be expected when exploring one's well-being and further measuring an individual's quality of life.

There are several generic and disease specific psychometric tools that are recognised and used in the field to measure health-related quality of life (HRQoL). However, there is not a gold standard of how to measure life satisfaction in TB infected patients.

The experience of SSA and the rest of the world, with regards to TB pandemic vastly differs. Over the years, healthcare programs have made a meaningful impact in identifying patients presenting for TB care. Assessing the quality of life of infected patients is one such strategy. The TB HRQoL literature has often focused on physiology-centred behaviour. However, strategies to modify risk behaviour needs to remain a main priority. An important factor when considering the well-being of TB infected South Africans, is noting the diversity of the individuals experience, rooted in the SA socio-political history which has resulted in high levels of social inequality and disparate socio-economic status groups. The dearth of adequate SSA literature on both TB infection and HRQoL, particularly in the context of SA calls for a need for more knowledge on these interlinked issues.

Hence, this research will contribute to and help close the existing gap in the literature. Additionally, it will shed more light on the documented experience of the infected patients with regards to quality of life. This will allow for a better understanding of ways in which alternate adaptation strategies can be used to assess the HRQoL of TB infected patients, while informing future health policies.

1.2.   Problem Statement

SA has been reported as one of the SSA countries hardest hit by the TB pandemic. Many studies have assessed the physiological impact of the disease, however only a few have assessed the direct burden on one's quality of life. Although TB treatment has been made readily available, most of the people that are infected present late to care and have a weakened immune system. This research aims to explore the connection between TB infection and the life satisfaction of its infected patients.

1.3.   Significance of Study

At a global level, SA is home to the largest proportion of TB infected patients. Due to the burden of disease, we have seen acceleration by healthcare programs to increase access to care among TB patients.

However, the impact of the disease and treatment on an individual's quality of life are imperative to understand if TB treatment and prevention programs are to be successful in SA.

1.4.   Study Objective

The primary aim of this study is to evaluate the impact of TB disease on South African adult patients. The specific objective of this study was to explore the socio-demographic factors that have an impact on the HRQoL among the TB infected population in SA. To achieve this goal, the following subsidiary research aims were framed.

- To understand the scope, source and outcomes of HRQoL.
- To report and compare the level of life satisfaction among TB infected adults across nine provinces in SA.
- To identify the implications of some socio-demographic factors when determining the level of life satisfaction in SA.
- To make suggestions on how to improve the quality of life among the TB infected adult population in SA.

1.5.   Research Questions

This study addresses a main question and sub questions.

1.5.1.   General Question

What factors impact the subjective well-being of the TB infected adult population in SA?

1.5.2.   Specific Question

This study seeks to answer the following questions:

1. What is the life satisfaction of TB infected adult South Africans?
2. What is the relationship between socio-demographic characteristics and TB infection?

3. What difference in quality of life exists amongst adults infected with only TB when compared to those co-infected with TB/HIV?

1.6.   Definition of Major terms

Tuberculosis: This an infection known to commonly attack the lungs and may spread to other organs in the body. The bacteria that cause the infection is called Mycobacterium tuberculosis (WebMD, 2019).

Latent Tuberculosis: This means that you have the presence of the germs that could cause TB present in your body; however, a strong immune system is able to stop the germs from spreading. The immune system ensures that you do not have the symptoms and that you will not be contagious (WebMD, 2019).

Multi-Drug Resistant Tuberculosis: This condition is caused by an organism in a TB infected patient which is resistant to the drugs that are used to treat TB disease, namely isoniazid and rifampin. It can be caused by misuse or mismanagement of anti-TB drugs, for example a patient doesn't complete the full course of treatment, or a patient has been provided with the wrong dose, there is an inconsistent supply of drugs from the healthcare provider or the drugs are of poor quality (CDC, 2016).

Health-related quality of life: This is a term used in public health, to measure the effects of chronic illness, treatments, and short- and long-term disabilities. Health-related quality of life is a multi-dimensional concept which embodies domains relating to physical, mental, emotional and social functioning. It is focused on the impact health status has on one's quality of life (HealthyPeople.gov, 2020).

Well-being: This is the perception that one's life is going well; it includes the global judgments of life satisfaction which ranges from very satisfied to depression. A good living condition is said to be a fundamental contributor to well-being, this can be seen in housing and employment conditions (CDC, 2018).

Life satisfaction scale: Life satisfaction is sometimes used interchangeably with happiness scale. It is the evaluation of one's life, not simply one's current level of happiness. The life satisfaction scale is a way of measuring life satisfaction in a subjective way. This measure considers the diversity among populations while observing the variety of perspectives and ways of life (MIDSS, 2020).

Socio-economic and socio-demographic: These are factors pertaining to a combination of sociological and demographic characteristics, for example age, gender, marital status, number of children, place of residence, level of education and employment status in each population (Merriam-Webster.com, 2020).

Human Immunodeficiency Virus: This is the virus that attacks the cells that the body generates to fight off infections. This weakens the immune system making its host more vulnerable to infections and disease. It is commonly spread through unprotected sexual intercourse or sharing injections when taking drugs (HIV.gov, 2019).

Acquired immunodeficiency syndrome: This the result of HIV when left untreated, it is the last stage that an infected patient goes through if their immune system is badly damaged by the virus. A patient is said to have progressed to AIDS if the number of CD4 cells in their blood has dropped below 200 cells/mm3 and have developed one or several infections due to a weakened immune system (HIV.gov, 2019).

CD4 count: This is a measure used to evaluate the quality of an individual's immune system. CD4 cells are the white blood cells that the body uses to fight off infections and are sometimes referred to as CD4 +T-cells. The CD4 count is inversely proportional to the HIV infection, as the infection progresses in one's body, the CD4 count drops (U.S. Department of Veterans Affairs, 2019).

Diabetes Mellitus: This disease is commonly known as diabetes; it is the result of an insulin disorder in the body. Insulin is the hormone that is made in the pancreas which moves sugar from the blood into the cell, where it can be stored or used as energy. Metabolic diseases such as diabetes do not allow one's body to either make enough insulin or use insulin in an effective manner. Diabetes Mellitus branches into two types of disease, namely Type one Diabetes and Type two Diabetes (Healthline.com, 2020).

Type one Diabetes: This type of diabetes is said to be autoimmune, which means it is a condition whereby an individual's immune system mistakenly attacks the body and destroys the cells in the pancreas. It is not clear what causes this, however this type of diabetes is seen in 10% of the diabetic population (Healthline.com, 2020).

Type two Diabetes: This type of diabetes transpires when the body does not use insulin, resulting in a sugar build up in the bloodstream (Healthline.com, 2020).

1.7. Outline of the remaining Chapters

In this chapter, the introduction and background, purpose and rationale for the study were unpacked. An overview of the problem statement, significance of the research and methods was discussed. In the next chapter, a closer look at limitations, delimitations and credibility around the topic of HIV and TB co-infection will be outlined.

Chapter 2: Reviews literature on research conducted by various scholars on the topic of socioeconomic factors, and how these factors can impact the well-being and HRQoL of TB infected adults. Some of the main themes discussed include the history of life satisfaction in health science, the occurrence of TB infection in SA and how it relates to socio-demographic factors given the country's political climate.

Chapter 3: Presents the methodology used in the study. It explains the research design, research methodology, data collection methods and population sample.

Chapter 4: Provides the data analysis, with a description of the findings obtained from the data, the results will be in terms of the observed quality of life and demographic variables.

Chapter 5: Is a discussion of the findings from the study presented in the previous chapter.

Chapter 6: Provides suggestions and recommendations with regards to the findings that were obtained. Finally, a conclusion on the overall research will be provided in this chapter.
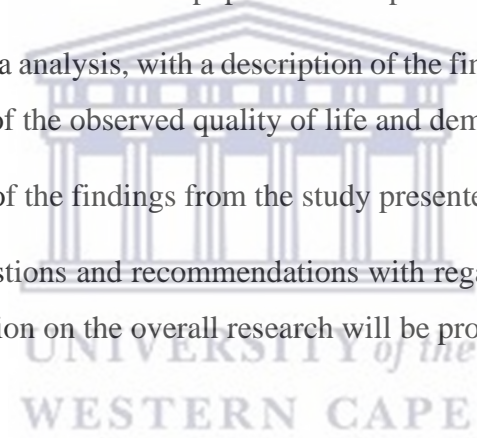
Chapter Two: Literature review

2.1.   Introduction

This chapter reviews literature relating to TB and the potential impact that this disease could have on one's quality of life. In this chapter, a review of works which relate to this topic is undertaken and informs the analytical framework for this study. TB prevalence is examined along various drivers; therefore, this review of literature is organised into the following subheadings.

i.   The History of Tuberculosis

ii.   Tuberculosis Pandemic in SA

iii.   Biological Risk Factors of Tuberculosis

iv.   Behavioural Risk Factors of Tuberculosis

v.   Life Satisfaction Defined

2.2.   The history of Tuberculosis

TB has been plaguing humankind for many years. The disease derives from the genus mycobacterium which is said to originate some 150 million years ago (Daniel, 2006). Archaeologists have found evidence of this disease in the remains of Egyptian mummies as well as in Egyptian art (Cave, 1939). The Christian Bible holds written accounts of TB disease which can be found in the books of Deuteronomy and Leviticus (Daniel & Daniel, 1999). By the middle ages, TB was well known, and the bacteria was living amongst us. The history of the disease took a more positive turn in 1882, when Herman Heinrich Robert Koch made a presentation to the Berlin Physiological Society (Daniel, 2006). Koch continued to refine his findings until he came up with a substance that he called tuberculin which reportedly had the ability to strip the bacteria of its harmful effects while in a living body, and not have any disadvantages on the host.

Finally, in 1944 the first effective antibiotic and bactericidal agent against TB were discovered (Daniel, 1997). This discovery was tested in a randomized controlled clinical trial conducted by the British Medical Research Council. The outcome of the results were 12 deaths under the treated arm and twice that amount in the arm that didn't receive the drug (Weitzman, et al., 1950). Approximately six years post trial, the first oral mycobactericidal drug was developed,

followed by rifamycin in 1957 (Weitzman, et al., 1950). The next chapter in the epidemic became the roll-out of treatment, with the goal of reaching affected persons across the globe (Daniel, 2006).

2.2.1. Disease Control Strategy

To reach TB infected patients, the WHO Tuberculosis Unit (1989) conducted a study where they profiled TB patients, documenting characteristics of those who had been infected by the disease. They noticed a significant difference between those suffering with TB in industrialized countries, when compared to those in developing countries (Kochi, 1991).

By the 1990s, Western and Central Europe had reached a state of steady decline in TB case numbers (World Health Organization, 2005). However, Eastern Europe had a different experience, specifically the former Soviet republics which encountered a sharp increase in TB cases. This surge was attributed by the economic decline in those countries, resulting in a devastating impact on health services and TB control (Shilova & Dye, 2001). SSA had been experiencing similar challenges dating back to the mid-1980s (World Health Organization, 2005).

Some characteristics were epidemiological in nature, for example, research shows that on a global scale, more cases of TB are reported among men rather than women (Hudelson, 1996). Yet, many of the characteristics related to a country's economic state. Developed countries were likely to report TB cases in the elderly which was the result of endogenous reactivation of an infection from a historical encounter with TB (Kochi, 1991). These countries had a small percentage of recent infections which was typically seen in ethnic minorities and migrants (Kochi, 1991).

All over the world we see that ethnic minorities and migrants are mostly classified as the disadvantaged population, likely to live in poor conditions. In this section we see how living conditions have a direct effect on an individual's HRQoL. This reinforces that socio-cultural factors have a huge impact on health outcomes (Weiss, et al., 2008).

2.3. Tuberculosis pandemic in South Africa

In the previous chapter we briefly outline the South African history to provide background which ultimately informs the TB pandemic. Scholars revealed that the political climate of the time had a lasting impact on systems such as the healthcare system. More recent literature shows that in addition to the already crippled South African healthcare system, is the weight of longterm diseases, specifically HIV/AIDS and TB epidemic which has resulted in overcrowding and scarce resources (Abdool-Karim, 2004). Granted, SA is a young democracy thus is expected to experience challenges, still good quality healthcare is possible for all if long-term disease is well managed and the public sector is better organized. The patients that default not only contribute to a vicious cycle of burden on the public healthcare system but are at risk of developing multi-drug resistance which can make their condition even harder to treat (Department of Health, 2004).

If we move from the national view and drill down to a provincial and district level. Paying close attention to the different provinces, in order to compare the estimated TB cases. We find evidence in the National Tuberculosis Research programme (2004) showing that, historically Kwa Zulu Natal (KZN) has had the largest number of reported cases of people infected with TB. In SA, it is reported that 73% of TB cases are co-infected with HIV (Khan, et al., 2001). Most South African official statistics report TB cases with the corresponding HIV proportion because TB is the most common cause of mortality among patients with HIV (Khan, et al., 2001). Below is a table on the reported annual TB cases in SA with proportion co-infected with HIV.

Province	Total TB Cases (n)	Proportion of TB Cases that are HIV+ (n)
Kwa Zulu Natal	65 654	42 675
Gauteng	45 598	20 519
Western Cape	34 211	10 948
Eastern Cape	56 495	22 598
Northern Province	23 338	8 402
Mpumalanga	15 657	9 238
North West	15 549	7 202
Free State	14 654	7 620
Northern Cape	4 649	1 534
South Africa	273 365	131 215

Table 2.1: Annual TB impact for South Africa with Proportion Co-Infected with HIV

In the KZN Province, both Ugu and eThekwini rank as the top districts with more than 1000 cases per 100 000 (Fourie, 2001). Below are maps showing SA and where KZN is positioned in the country, as well as the different districts in the KZN province.
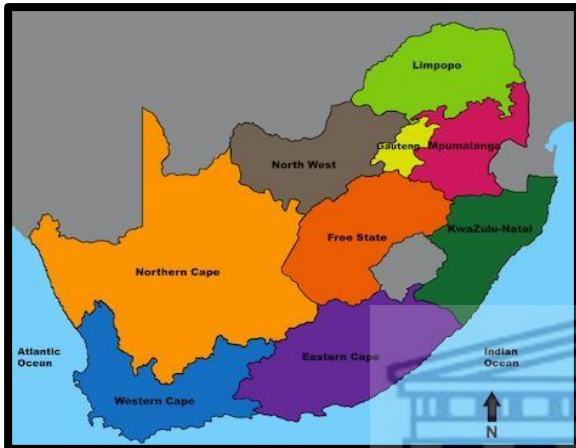
Figure 2.1: Map of South Africa where Kwa Zulu Natal is shaded in dark green (Retrieved on the 10th September 2019, https://www.familysearch.org/wiki/en/South_Africa_Genealogy)

Figure 2.2: Map of Kwa Zulu Natal where Ugu is yellow, eThekwini is white and (Retrieved on the 10th September 2019, https://en.wikipedia.org/wiki/List_of_municipalities_in_KwaZulu-Natal)

2.4. Biological Risk Factors of Tuberculosis

2.4.1. TB/HIV co-infection

HIV is reported to be prevalent in developing countries, with the highest prevalence being in the most economically productive age group of 15 – 54 years (Department of Health, 2004). In SA, one is at risk of acquiring HIV if they practice unprotected sex, more specifically among those with a high partner turnover or partner concurrency (Western Cape Government, 2016). At a more granular level it has been suggested that gender inequality and the coercive nature of some sexual transactions can drive the risk of HIV infection (Abdool-Karim, 2004). The high HIV prevalence rates have resulted in an increase in TB cases in the country (Western Cape Government, 2016).

TB is the type of infection that exploits those with weakened immune systems (Mukadi, et al., 2001). Coincidently HIV weakens the immune system, increasing the likelihood for TB infection in HIV positive individuals (Iwuji, et al., 2013). Those with a weak immune system face the chance that latent TB will advance to TB disease which has the ability to worsen the HIV condition (Camoni, et al., 2013). Latent TB occurs when the TB bacteria is present in the human body, but the bacteria exist in very small numbers, hence people carrying the bacteria do not experience any obvious signs of the disease (Piscitelli & Gallicano, 2001). There is evidence that shows that patients that are initiated on ART develop a strengthened immune system that can prevent latent TB from advancing to full blown TB.

Another common characteristic of TB is that it is a highly contagious disease, as it is able to spread from person to person (Piscitelli & Gallicano, 2001). Mycobacterium generally targets the hosts lungs and has the ability to spread in the body, affecting other organs which include the kidneys, spine or brain (Yepthomi, et al., 2006).

These insights shed light on the importance of early presentation to care for HIV and TB coinfected patients, as failure to do so, is likely to result in the decrease in HRQoL for co-infected individuals.

The WHO recommends that patients are initiated on anti-TB therapy and upon completion they should be initiated on ART treatment (World Health Organization, 2010). This recommendation stems from the concerns surrounding drug interactions as the existing ART treatment has pharmacologic interactions with rifamycin which is used to treat TB infections

(Piscitelli & Gallicano, 2001). Another concern was that of toxicities as the treatment of TB requires the intake of two to four drugs daily, and HIV patients are required to take up to three different medications daily. Research suggests that taking these drugs simultaneously could result in toxicities and harmful side effects (Girardi, et al., 2001). Each of these drugs is associated with adverse events which include neuro-psychiatric challenges (Yepthomi, et al., 2006). These findings highlight a need to explore data that might be collected in studies of combined treatment, in order to better understand the details of how toxins are tolerated by HIV and TB co-infected patients (Abdool-Karim, 2004).

In this section, we learn that HIV and TB co-infection is the result of a weakened immune system (Camoni, et al., 2013), which is a by-product of late presentation to care (Mukadi, et al., 2001). This association can be drawn because HIV infected individuals that are currently initiated on ART are said to have a higher CD4 count which strengthens their immune systems hence preventing latent TB from evolving into full blown TB. This vicious cycle continues due to non-disclosure of HIV status and the stigma surrounding this disease. In a study conducted in one of the rural districts of Kwa Zulu Natal, it was found that only two thirds of the participants had disclosed their status to a close friend or a trusted family member. In this sample it was estimated that only two out of twenty participants are comfortable to disclose their status to their primary partner (Abdool-Karim, 2004).

2.4.1.1. Integrated versus Sequential Treatment

The previous section we answer the question of optimal time to initiate ART treatment to TB patients by referencing the WHO. Jointly the WHO and UNAIDS have shared a detailed approach for co-infected patients, providing recommendations that encourage a sequential approach to treatment. However, other research shows that the immune recovery associated with the use of ART is likely to enhance the recovery from TB infection. A greater concern to consider when encouraging sequential treatment is how deferral of ART until after TB treatment is completed could result in progression of HIV disease, therefore not providing its patients a fair chance to survive. Below are the possible advantages in both treatment strategies, summarized in Table 2.2.

Integrated HIV ART during TB Treatment	Sequential HIV ART after Completion of TB Treatment
May impact positively on TB treatment outcomes (failure, relapse rates)	Decrease the pill burden at any given point
May impact positively on survival	Avoids the increased risk of paradoxical reactions/immune reconstitution syndromes
Utilizes the TB DOT program as an opportunity to monitor treatment and promote adherence	Avoids side effects and toxicities resulting from multiple drug combinations
Utilizes the existing TB DOT infrastructure	Avoids pharmacologic interactions between TB and HIV ART drugs
	Avoids overburdening the TB DOT infrastructure

Table 2.2: Advantages of Integrated and Sequential treatment HIV and TB co-infected patients

2.4.1.2. Burden of Disease on Cognitive State

So far, we have learnt that TB can increase viral replication which results in HIV quickening to AIDS and leading to increased mortality. These insights have resulted in research exploring the impact that this co-infection can have on a patient's cognitive state.

Research shows that cognitive impairment is reported 50% of the time in the overall HIV population (Western Cape Government, 2016). Cognitive impairment is defined as the neuropsychological weakening in two or more domains, namely fine movement, memory, fluency and executive functioning (Pebody, 2017). Functional impairment is the decrease in everyday functioning (U.S. Department of Health and Human Services, 2011). These neurocognitive complications can be grouped under a single name, HIV Associated Neurocognitive Disorders (HAND). It is important to note that cognitive problems are defined on a scale. The scale can be unpacked in ascending order, where asymptomatic describes a minor change without a noticeable impact on daily life. The second level of cognitive impairment is described as mild, which refers to a limited impact on one's daily activities. Lastly there is the more severe case of cognitive impairment, which is known as dementia, this level has the ability of interfering with regular daily life (Pebody, 2017).

There is a body of research that has been conducted in India to examine the nature of HIV associated cognitive disorders. In a study done by Yepthomi et al. in 2006, the authors show

that the neurocognitive impairment rate is 55% for patients with advanced HIV disease. Another study done by Riedel et al, 2006 shows that 35% of HIV patients scored in the impaired range according to the international dementia scale. Although many authors have developed an interest in how HIV and cognitive disorders relate, researchers have conflicting views on whether people with asymptomatic impairment are likely to increase in impairment (Ramachandra & Archana, 2015).

2.4.2. TB/Diabetes co-infection

The previous section explores the available evidence surrounding the link between TB and HIV/AIDS. Research exhibited that at an individual level HIV/AIDS is a strong risk factor for TB development and can affect one's cognitive state. However, a study in California showed that Diabetes Mellitus (DM) is equivalent to HIV in terms of the estimated risk for TB development (Pablos-Mendez, et al., 1997). The association between TB and DM is not a new discovery, medical scientists were aware of the disease linkage, dating back to the early 20th century (Ruslami, et al., 2010). Towards the end of the 20th century, a treatment was developed for both diseases which could be the reason for relaxed monitoring and control of co-infection (Ruslami, et al., 2010). Studies show that DM behaves in the same way as HIV, in that it causes an individual to have a weakened immune system, putting one at risk for the development of TB (Singla, et al., 2006).

In chapter one we define Type one DM as the less prevalent type and having a more negative impact on the immune system when compared to Type two DM. Feleke et al. conducted a study in 1999, on patients in Ethiopia. The findings of the study were that those with Type one DM had a threefold to fivefold higher chance of developing TB disease when compared to those with Type two DM. In addition, it was found that the development of TB in such patients, would be due to unmanaged Type two DM. Examples of mismanagement include, long durations of illness and poor glucose control (Swai, et al., 1990). Negligence is a huge barrier to disease control; this could result in an unintended ripple effect causing the spread of TB disease. Therefore, it is important that DM prevention, early detection and treatment is taken seriously especially in developing countries given the high TB burden.

In 2015 SSA was documented to have 14.2 million DM cases, it has been projected that this number will be more than double by the year 2040 (Ogurtsova, et al., 2017). The growing DM

prevalence in SSA is said to be the outcome of urbanization and a change in lifestyles for those in developing countries (Berkowitz, et al., 2018). Based on the available literature, DM is associated with higher age and body weight (Ruslami, et al., 2010). Given that SA had one of the highest TB incidences in the world with above 500 cases per 100 000 (World Health Organization, 2019), it is useful for healthcare providers to not only recognize these characteristics in patients but to consider screening them for both DM and TB. This could be a useful method of increasing TB detection, after all Pan et al. in 2015 found that up to 15% of TB cases in SA might have been qualified by DM.

2.5.   Behavioural Risk Factors of Tuberculosis

In the previous section we saw that HIV and TB have a strong direct relationship, particularly in SSA as an increase in HIV infections yields more TB cases. However, HIV infection rate is not the only driver of TB disease. Earlier in the chapter we learnt that the WHO profiled TB patients based on socio-factors as well as epidemiological trends. In this section we explore the more common ones, focusing mostly on the characteristics that possibly resonate with a subSaharan African TB patient.

2.5.1.   Gender

Men are more likely to be infected with TB than women, is a fact to consider when observing the flow in TB pandemics (van den Hof, et al., 2010). Still, gender is a complex variable, one would need to understand the controls within gender which cause it to influence the incline of TB cases in a country. Here we explore how gender specific traits can lead to infection and late presentation to care.

Sex and gender are used interchangeably to distinguish the biological variance between men and women. However, these words are defined differently. Sex speaks only to the biological attributes of both humans and animals, looking at physical features, genetic makeup, hormones and anatomy (Canadian Institute of Health Research, 2020). Whereas gender refers to social constructs which are knitted in roles, behaviours, expressions and identities of women and men (Weiss, et al., 2008). Gender is not static, its change is influenced by how individuals view themselves and others, this is motivated by the expectations placed on them and the way it is institutionalized in society (Canadian Institute of Health Research, 2020).

Although some reviews have alluded to the joint contribution of biological and socio-factors to the high TB infection rates in men. In this study gender will be discussed with a focus around socio-factors.

The biggest barriers to TB control, is late presentation to care and the development of multidrug resistance. It has been documented that men tend to delay searching for care when compared to women (van den Hof, et al., 2010). This is evident in the characteristics of the symptoms reported. Female patients are less likely to report blood in their sputum (Weiss, et al., 2008). While women were found to be more proactive in seeking help, they were more probable to use home remedies, consult traditional healers and self-medicate (Weiss, et al., 2008). Some of the main reasons for women to resort to this method of treatment, is the fear of social isolation, poor-quality service and lack of confidentiality. It is common for women in developing countries to meet these blocks (Bates, et al., 2004).

Men too have reasons that draw from societal views, it was found that when a man presented late to care, it was due to a concern around cost of treatment and the potential impact that the treatment process could have on their jobs (Johansson, et al., 2000). Another fear that most men had was the effect that their TB infection could have on the family economy as well as the impact it could have on their social status within the home (Somma, et al., 2008).

Men are also more likely to default when compared to women, this being the act of cutting one's treatment short, therefore not completing the course of treatment. This behaviour is usually linked to inconvenient clinic hours which may force them to choose between treatment and work. For a disadvantaged individual without tertiary education, who is likely to be living hand to mouth, the decision to choose work over treatment for a cough that has seemingly gotten better, seems justified (Weiss, et al., 2008). However, this logic results in multi-drug resistant (MDR) TB or fuels the spread of disease (Barter, et al., 2012).

Another behaviour that isn't gender specific but is more commonly found in men is that of alcohol abuse and tobacco smoking (van den Hof, et al., 2010). On a global scale it has been reported that smoking rates are higher in men (Barter, et al., 2012). Researchers view smoking as one of the major behavioural factors that contribute to the TB burden in a society. The smoking of tobacco has been reported to cause many diseases, such as cardiovascular disease (CVD) and chronic obstructive pulmonary disease (COPD), however lung cancer is the disease mostly linked to smoking (Peto, et al., 1992).

In the previous chapter we saw that TB is most likely to present itself in the lungs of a host with a weakened immune system. This is concerning given that most smokers tend to experience strain in the pulmonary region overtime. In 2009 a research study was conducted in South Korea to explore the degree at which smoking, and TB disease relate. It was found that 50% of the time, smoking was associated with mortality from TB infection (Jee, et al., 2009). This high correlation between TB infection and smoking, suggests a need for joint control between public healthcare providers and the tobacco industry (van den Hof, et al., 2010).

SA has been reported to have a 17.6% national smoking prevalence (Berkowitz, et al., 2018). Although this percentage appears to be small, it is important to know the populations and societies that have been counted, in order to formulate an innovative healthcare programme that discourages tobacco use, in TB/HIV epicentres of the country. In SA, smoking prevalence differs by population group and gender (Groenewald, et al., 2007). Historically, smoking rates were highest among coloured men and women, however prevalence has recently decreased in this group, particularly in the low income and 16-24 age category (Groenewald, et al., 2007). This decrease is attributed to the South African government's commitment to improving tobacco control, by increasing the tax burden on cigarettes which has resulted in a change in people's attitude towards smoking (Van Walbeek, 2002).

In this section we explore the different barriers that each gender is likely to experience in the fight against TB disease, it would also be interesting to see how these challenges play out from the initial stage of infection, through to recovery.

The figure below is an illustration of the variance between gender during the TB treatment cycle. The data visual explores gender behavioural traits at different stages of the cycle, here the cycle is divided into seven stages namely: TB occurrence and epidemiology which is the symptoms stage; help seeking; access to health services; diagnosis; initiation of treatment; treatment adherence and treatment outcome (van den Hof, et al., 2010).
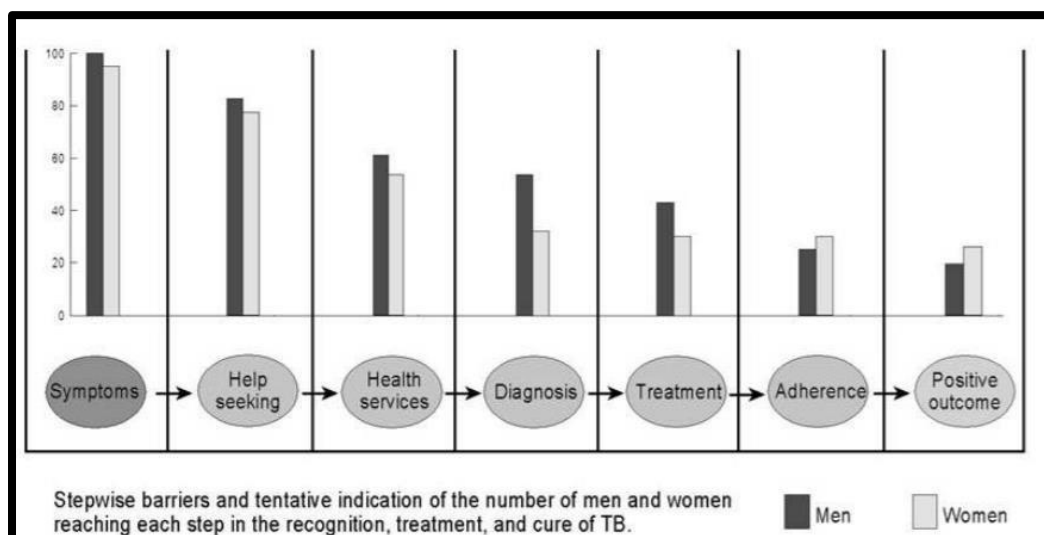
Figure 2.3: Gender differentials at various stages of TB infection (van den Hof, et al., 2010)

2.5.2. Socio-cultural Factors

In the previous section we unpacked the gender specific barriers to TB care and the reasons for the continued spread of disease. Here we explore how stigma, awareness and income can present a block to TB control.

Cambridge Dictionary defines stigma as a strong feeling of disapproval that most people in a society have about something (Cambridge Dictionary, 2020). Goffman adds, that it is a deeply discrediting attribute that reduces a person 'from a whole and usual person to a tainted, discounted one' (Goffman, 1963). The World Health Organization has been quoted saying that stigma is the single most important barrier to overcome in societies, as it is associated with discriminating persons that are ill from specific diseases. Stigma is the outcome of stereotyping which turned into prejudice and finally became discrimination. Those being discriminated upon are likely to experience feelings of shame, blame, hopelessness, distress, secrecy, loneliness, derogatory labels, misrepresentation in the media, isolation and exclusion (Govt of Western Australia: Department of Health, 2009). These are indications of how stigma can impact one's emotional well-being and is likely to worsen the individual's illness (van den Hof, et al., 2010). Sadly, fear of discrimination can lead to lack of disclosure and the reluctance to seek help (Govt of Western Australia: Department of Health, 2009). Infected individuals dread the negative comeback that can be sparked by disclosure. These individuals expect their friends, family or colleagues to respond in a way that is blameful, argumentative or have an embarrassment undertone (Hutton & Misajon, 2012).

The emergence of a disease epidemic is usually accompanied by an 'epidemic stigma' and the most effective way of dealing with unsupportive social interactions is through education (Herek & Glunt, 1988). By equipping societies with factual information, they can be empowered to help in eradicating the myths tied to some disease beliefs, which in turn will increase support for those that are ill hence improving their overall well-being (Hutton & Misajon, 2012).

Where TB disease is concerned, research shows that women are most likely to confront issues of social stigma, these women live in fear and anticipation of how this disease could impact their lives at home, showing concerns around abuse, conflict with spouse and family members, abandonment, and in more extreme cases there was a fear of divorce or difficulty finding marriage (van den Hof, et al., 2010).

Earlier in this chapter we saw how closely related the HIV epidemic is to the TB epidemic, in most cases those infected with HIV are likely to also be infected with TB. This population struggles with what is known as 'felt' stigma which has a huge impact on their subjective wellbeing. Cummins et al. in 2009 found that living with HIV may weaken the process in the human brain that helps an individual to maintain a positive view of themselves. This result was rooted in the long-term effects of the disease, how much more can be said about those that have been co-infected or those that have developed MDR (TB).

Men were more concerned about how TB infection could yield work-related issues (Somma, et al., 2008). Men in SA were more likely to have non-medical beliefs around TB which were encouraged by traditional beliefs (Atre, et al., 2004). This finding exposes the influence that myths can have on stigma and in turn present as a barrier to TB care. One way of dealing with non-medical beliefs is by improving awareness on signs and symptoms of TB disease and creating opportunities for interventions (Lienhardt, et al., 2001).

Awareness in TB control is vital, by educating populations of symptoms of disease, we can reduce late presentation to care and individuals will not endure long-standing coughs (Meehan, et al., 2018).

TB treatment has been made readily available across the world and the underprivileged are able to benefit from the Directly Observed Therapy Short-course (DOTS) program by receiving anti TB treatment at a local public health provider at no cost (Barter, et al., 2012). Still, an individual's level of income continues to present as an economic barrier to TB care (van den Hof, et al., 2010). The Sort-course is six months long (Abdool-Karim, 2004) which requires

patients to visit a clinic or hospital regularly during this time. This exercise can have a devastating impact on the households' economic situation. For example, travel costs that were not previously budgeted for could encourage the redistribution of funds, therefore resulting in the neglect of other needs (Barter, et al., 2012). Countries like SA which have a high TB burden, tend to provide a free sputum smear microscopy with a focus on pulmonary TB. However other TB-related tests come at a cost (Lonnroth, et al., 2010). Chang et al. in 2004 conducted a study in the quality of life in TB and found that more than 50% of TB infected individuals have been reported to having financial difficulties as a result of the costs incurred by TB disease. Prevention programmes should be designed to consider more than one screening method as this can improve linkage to TB care while reducing the economic strain on an already poverty-stricken population.

2.5.3. Occupational Factors

In the previous section we unpacked the socio-cultural factors that pose a challenge to TB care and prevention of disease. This section explores the structural barriers to TB control. The following topics will be discussed: indoor air pollution and overcrowding.

Indoor air pollution can be caused by the usage of biomass and wood in the house. In developing countries, biomass and wood are commonly used for cooking and to provide the household with warmth (Sumpter & Chandramohan, 2013). Indoor air pollution has been connected to many health concerns. Naeher et al. found that in underprivileged communities, it was common for persons that are 15 years or older to have some type of health effect due the use of solid household fuels (Naeher, et al., 2007). The type of health effects consisted of COPD and lung cancer which are also associated with tobacco smoking (Peto, et al., 1992). These diseases as we have seen in the previous section can cause significant damage in the pulmonary region, making an individual more vulnerable to acquiring TB (Jee, et al., 2009). Garcia-Sancho et al. conducted a more in-depth study in rural Mexico to better understand the correlation between TB disease, indoor air pollution and gender. The authors found that women are more likely to develop TB disease from the regular use of biomass fuels in the household and that biomass fuels are part of the top ten most common risk factors to consider in TB control worldwide (García-Sancho, et al., 2009). This suggests that TB prevention strategies should consider a more gender orientated approach when dealing with societies that consume biomass fuels. Mainly because half the world population live-in low-income countries and are likely to encounter indoor air pollution (Sumpter & Chandramohan, 2013).

There is a close relationship between housing conditions and health status, good hygiene is required in a household to prevent disease. One way of maintaining cleanliness in a household is by ensuring that there is sufficient space to help with the circulation of clean air and improving sanitation (Bonnefoy, 2007). Sadly, many persons residing in low-income countries, struggle to maintain such housing conditions (McNicholas, et al., 2000), due to overcrowding.

The United Nations-HABITAT (UN-HABITAT) defines overcrowding as more than two people in one room (Hall, 2010). Whereas the World Health Organization considers the average living area of a person in a dwelling (Nkosi, et al., 2019). Research found that in SA, more than one quarter of formal, low-cost housing were overcrowded (Statistics South Africa, 2016). In SA, it was found that the city of Johannesburg was mostly associated with population density, it being a metropolis means many SA citizens and others from surrounding countries are drawn to the city. Johannesburg is an important economic hub where many seek better job opportunities and education (Nkosi, et al., 2019).

A great body of research shows that overcrowding is a major risk factor when dealing with infectious diseases. Overcrowding promotes disease transmission through talking, laughing, eating, coughing, sneezing and sleeping together (McNicholas, et al., 2000). Baker and Venugopal conducted a case-control study in Norway and found that overcrowded dwellings have a strong direct relationship with Respiratory Syncytial Virus (RSV) (Baker & Venugopal, 2011).

Population density may not be the cause of disease however it does create a challenge in disease control especially where TB is concerned, given that it is a highly contagious disease (Piscitelli & Gallicano, 2001).

2.6. Life Satisfaction Defined

Up until this point we have unpacked TB disease and the various factors that can present as a block to TB control. These factors can be biological, social or structural and are able to cause harm simultaneously. The previous sections have alluded to how these factors can affect one's well-being and HRQoL. This section will look at the genesis of life satisfaction, well-being and quality of life in research and will be organized according to commonalities in findings across research conducted in the public health field. We explore the psychological and emotional distress that has been documented about TB infected persons.

2.6.1. Human Well-being

The well-being of a human is a very complex topic, it is a multifunctional notion that considers several aspects of an individual's life. Alatartseva and Barysheva (2015) use four main concepts to describe human well-being which are:

1. A human has well-being if they exist in accord with their nature, their essence.

2. A human has well-being if they understand (are conscious of) what things are good for them and have an opportunity and intention to achieve these good things.

3. A human has well-being if they have an opportunity to realize their potential as human beings.

4. A human has well-being if the society constituting the grounds of the state creates conditions and provides opportunities for them to exist in accord with

   their nature, realize their potential as human beings, and achieve the good things of life that humans strive to achieve.

These concepts are both internal and external in nature hence governments and social interventions should strive to understand and explore the levels of well-being in the societies they serve (Van der Heyden, 2017). Due to this internal and external nature, one could further breakdown human well-being into subjective well-being (which relates to moral-psychological aspects) and objective well-being (which is mostly associated with socio-economic aspects) (Altatartseva & Barysheva, 2015). Moral-psychological aspects refer to a person's feelings about themselves and explores if they are satisfied with their own life (International Wellbeing Group, 2006).

Literature shows that subjective well-being is inversely related to adverse health, therefore as subjective well-being decreases the risk of adverse health behaviours increases (Weiss, et al., 2008). This shows how important it is to monitor subjective well-being because its reduction can have a huge impact on an individual's day-to-day coping hence affecting disease management (O'Cleirigh & Safren, 2006). Findings show that although many states have antidiscrimination laws in place, still discrimination continues to rank high on the list of risk factors that have a negative influence on an individual's subjective well-being (Bunn, et al., 2007).

In this study we spend time trying to understand the subjective well-being of South African adults infected with TB disease. There is value in better understanding an individual's psych emotional experience, along with other features that have a biological undertone (Cummins, et al., 2004). This insight could aid public health providers in preparing an environment that is supportive for persons battling TB infection because unhappy people cannot create or share in a healthy society (Weiss, et al., 2008).

As we have seen well-being is a broad topic, now we will explore its different types which consist of physical, mental, emotional and social.

2.6.1.1. Physical Well-being

Physical well-being relates to an individual's bodily functions. Even with the presence of disease, one can improve the functioning of their body through regular exercise, healthy eating and by avoiding preventable conditions (American Association of Nurse Anesthetists, 2020).

2.6.1.2. Societal Well-being

An increase in societal well-being is evident in an individual's ability to feel comfortable participating in a community (Davis, 2019).

2.6.1.3. Emotional Well-being

A person that is emotionally well, is able to manage stress using healthy techniques. This is a resilient individual and is able to balance both positive and negative feelings (Keyes, 2007).

2.6.1.4. Social Well-being

Social well-being relates to the ability to develop and maintain supportive relationships. The level of well-being is evident in one's ability to communicate well with friends, family and those encountered in social settings (Davis, 2019).

2.6.2. The Role of Health Information Systems

The need to understand the well-being and impact of disease on the quality of life of individuals with TB infection is seen in both developed and developing countries. However, it is important to remember that sub-Saharan Africa is home to the larger proportion of this population, with SA ranking high among these countries. For the state to better control the TB pandemic, they require timely availability of reliable and valid data (Van der Heyden, 2017).

Health surveys can be seen as a sound measurement that can be used to assess the quality of life of ill persons, producing key health statistics such as morbidity and health status, risk factors or health determinants, service use and delivery, drug availability and health resources (Boerma & Stansfield, 2007). The instrument can also be used to generate information which displays concurrency across factors (Van der Heyden, 2017).

Population-based sources are rich with insights, they provide a nuanced view of a population. Population-based sources are able to drill down to a sub-population and individual level, through the use of a household and other population surveys (Health Metrics Network, 2012).

Figure 2.4 serves to illustrate the significance of population-based surveys as a component in the health information system.
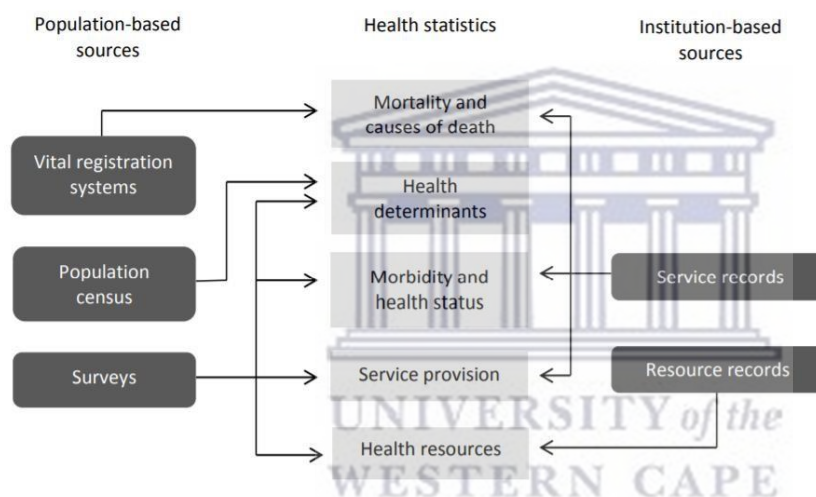
Figure 2.4 Components of a health information system (Health Metrics Network, 2012)

This section has shown that, to fully understand the well-being of a TB infected South African, one would need to acknowledge the multiple overlapping layers which it includes. Furthermore, there is a need to use instruments that recognize the behavioural composition of developing countries, as disease and other complex household issues are closely intertwined. For this reason, researchers interested in TB should ensure that the instruments that are being used in South Africa, are designed to fit its cultural context, or risk an overestimation or underestimation of HRQoL scores, thereby under-reporting or over-reporting the actual impact of disease on an individual's well-being.

2.7. Chapter Summary

In this chapter, the literature concerning TB infection and the impact it could have on a patient's quality of health has been reviewed and discussed. The literature revealed factors contributing to an infected patient's quality of life. The discussion highlights late presentation to care as the main driver, revealing related factors such as stigma surrounding the disease and non-disclosure of one's status. The strategies used for treating infected patients and benefits of treatment have also been examined. However, life satisfaction or subjective well-being is usually explored in two parts, either from a socio-economic perspective or a health-related perspective. Though, well-being should be measured at a global level with a consideration of how variables with a socio-economic, socio-demographic and health related, can collectively contribute to an individual's overall well-being.

Chapter Three: Research Methodology and Procedures

3.1. Introduction

This chapter describes and explains methods, techniques, and procedures used in the collection of vital information relating to this study. The following items will be discussed: research methodology, data collection methods, study and research design, research setting, study population, ethical consideration, description of the instrument, study variables and data analysis.

3.2. Quantitative research methodology

A quantitative methodological approach is used to quantify a problem through the generation of statistics and the use of numerical data. This approach is used to formulate facts and find patterns/trends in research. Bryman and Bell (2005) describe quantitative research as 'entailing the collection of numerical data and exhibiting the view of relationship between theory and research as deductive, a predilection for natural science approach, and as having an objectivist conception of social reality.' A quantitative assessment of well-being distribution is an essential part of TB infection. It will provide an understanding of the life satisfaction of TB infected South African adults which is important to understand for TB control planning in the country.

3.3. Data collection methods

This research is a sub-study that used secondary data to identify the gaps, what additional information needs to be collected and to better understand the problem. The relevant data has been collected using a longitudinal survey design. Du Plooy-Cilliers et al. in 2014 defines a longitudinal survey design as a method used to determine the long-term effect of an intervention. Furthermore, longitudinal studies are useful when one needs to collect information on a continual basis. The main advantage of a longitudinal survey design is the ability to allow the researcher to observe changes that may occur over time. The type of longitudinal survey that we are interested in for this project is of a panel type. In a panel study the same respondents from a population, is used at different time points when the survey is repeated.

Participants will be expected to complete the same questionnaire at different time intervals. The tool is designed to evaluate the participants overall life satisfaction.

3.4.   Study design

The study is a panel/longitudinal study which began in 2008 with a national representative sample with an estimated 28 000 participants across 7 300 households across the nine provinces of SA. The research design adopts a descriptive survey which involves recordings of existing conditions. The survey is repeated every two to three years with the same individuals and those that live with them at the time of interview. It is an opportunity to investigate phenomena in their natural setting, providing a subjective view of the event (Kothari, 1990). Each round of data collection is referred to as a wave.

3.5.   Research setting and Sample

The study used the National Income Dynamics Study 2017. The target population was those diagnosed with TB, in all the nine provinces of SA. For this study, a subset of data was created from the original data which consisted of 30 110 observations and 1 144 variables. This resulted in 44 individuals who were measured against the nine variables which are outlined below. The study considers a subset consisting of only those that agreed to be currently taking medication for Tuberculosis. A subset of individuals co-infected with both TB and HIV will also be explored, given the high correlation between these diseases.

3.6.   Instrument

The instrument used in the study was a questionnaire, the participants were asked to complete nine questionnaires in total. For this study only the data from the Adult questionnaire, where an adult was defined as a person that was 15 years or older on the day of the interview. For this study we used the data collected in wave four interviews, as it is the most recent survey and with it being conducted three years ago, one can draw inferences that might relate to current events.

3.7.   Ethical considerations

It is vital for any research to take into consideration ethical issues. According to Schurink (2005), ethical considerations are the concerns that arise regarding the proper execution of research in a way that is not harmful to research participants. Ethics is the study of moral principles (McMillan & Schumacher, 2006), considering ethical issues such as: protection from harm; informed consent; right of privacy and honesty throughout the research (Cohen, et al.,

2005). Although this is a sub-study, there is documented evidence on the National Income Dynamics Study of 2017 which states that all participants were provided with an informed consent document before screening and prior to enrolment. The informed consent was designed to describe the purpose of the study with procedures, potential risks and benefits. In order to uphold participant confidentiality, all evaluation forms and reports were identified by code.

For this reason, all participants were assigned code names which guaranteed privacy, anonymity and confidentiality throughout the study.

3.8.   Study variables

The following variables have been selected for this study and are informed by the literature that was explored in chapter two (Appendix) provides definitions and measures of these variables:

i.   Age
ii.   Gender
iii.   Population group
iv.   Place of residence in 1994
v.   Labour market participation
vi.   Education
vii.   Health
viii.   Emotional Health
ix.   Well-being and social cohesion

3.9.   Statistical Analysis

After obtaining the data from the National Income Dynamics Study 2017 wave four questionnaire, the data were coded, organized and analysed in R studio using Multiple Correspondence Analysis (MCA) as the preferred statistical analysis technique.

MCA were used to identify significant variables associated with the well-being of TB infected participants. MCA is a branch of Correspondence Analysis (CA) which houses a family of descriptive methods that allow one to analyse patterns among several categorical dependent variables (Abdi & Valentin, 2007). MCA can be applied to datasets that contain both qualitative and quantitative variables. It is an opportunity to group observations with similar characteristics and identify associations between variable categories (Kirthana, 2020). It is widely used to

reveal these relationships in a complex dataset, on a multidimensional space which lets you visualize the trends graphically (Sourial, et al., 2010).

The current analysis utilised two dimensions to illustrate the relationship among row (participant level data) – column (selected questions) pairs, building the associations depicted by the chi square analysis (Abdi & Valentin, 2007). Each dimension views multiple correlations with corresponding eigenvalues representing the relative importance of each variable on wellbeing (Sourial, et al., 2010).

3.10.   Chapter Summary

In this chapter, the research perspective, instrument and methodology were discussed. The analytical framework provided a view of the quantitative approach that will be used. Sampling and data collection were specified. The credibility and trustworthiness of the research tool was presented in chapter two. In the next chapter, there will be a discussion on the study findings.

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Chapter Four: Data Analysis and Findings

4.1.   Introduction

In the previous chapter we mention that this study utilized data from the fourth wave on the NIDS which was conducted in 2017. This chapter sets out to analyse subjective well-being within the TB population, across the nine provinces of South Africa. The analysis will be divided into subsections examining overall health satisfaction at a national level, how subpopulations behaved at a psychological wellbeing level, the characteristics of the respondents and how the different factors contribute to overall well-being.

4.2. Distribution of Health Satisfaction in the TB population of South Africa

The South Africa Presidency in 2006 set out to explore and track the well-being of South Africans, young and old, rich and poor. This effort resulted in what we now know as the NIDS study, the main objective of this study is to document the happiness level of the respondents in the survey. To measure overall self-reported satisfaction or subjective well-being, the following question was asked:

Using a five-point scale of one to five, where one is "Excellent" and five is "Poor", how would you describe your health at present? (NIDS, 2017)

For Figure 4.1, the data were recoded to exclude missing data and all the cases where the respondent refused to rate their satisfaction. Figure 4.1 on the next page, reveals the distribution of health satisfaction as captured in the adult questionnaires during the wave four interviews.

Figure 4.1. Distribution of Health-Satisfaction among the TB population of South Africa (NIDS, 2017)

Figure 4.1. displays a left-skewed distribution of health satisfaction. The negatively skewed distribution exposes the high level of dissatisfaction that is experienced among the TB infected population of South Africa. Note that these summary statistics are at a national level hence masking all demographic variance and other attitudinal factors.

4.3. Sub-population distribution by Attitudinal variables

In the previous chapter we mentioned that MCA will be conducted in this study. The analysis was conducted in R studio using the Factor Miner package. One of the features of this package is the ability to draw confidence ellipses. The objective of drawing a confidence ellipse is to reveal if the categories of categorical variables are significantly different from each other (Husson, et al., 2008). Figure 4.2. represents this view for the attitudinal variables that were selected for this research. An overlap in ellipses suggests that there is no significant difference between those categories, in the given variable.

The ("Happy" variable) was used to measure the degree of happiness that the respondents felt, it was found that all categories overlapped which suggests that the categories are not significantly different. The same was observed under the variable used to measure the participants' depression levels.

Under the ("Fear" variable) we see that the response "all of the time" is significantly different from the others. The same can be said for the "cannot Self-motivate" variable which shows an

overlap in all categories except for the "all the time". These findings are interesting as they suggest that maybe attitudinal variables should not be measured with more than two categories, as some categories may be closely linked for a respondent.
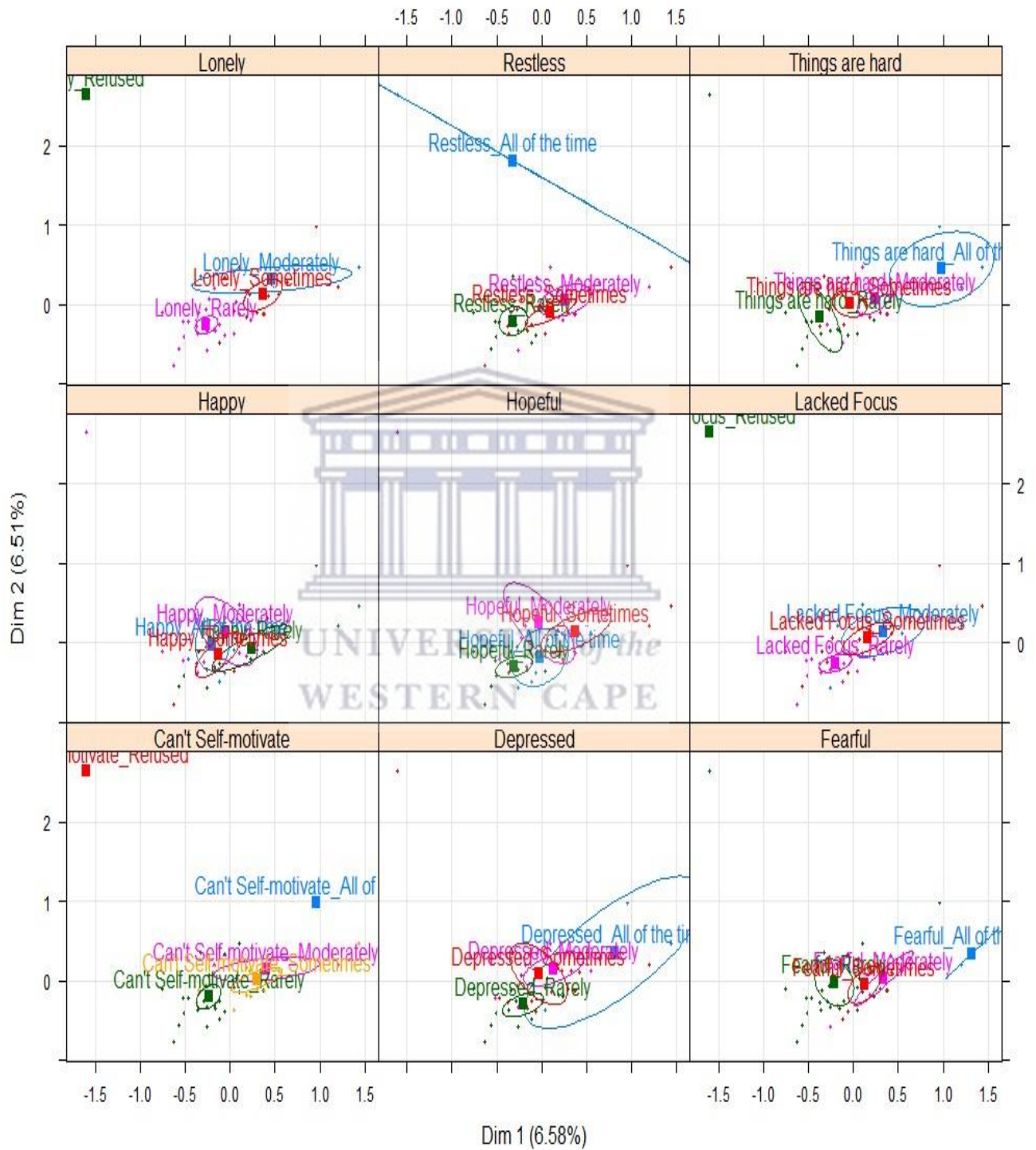
Figure 4.2. Confidence ellipses on the categories of attitudinal variables

4.4.   Characteristics of Respondents

At the beginning of this chapter, we provide the summary statistics at a national level, masking the differences in demography across the studied population. Table 4.1 below, provides a descriptive overview of the socio-demographic variables that were considered for analysis, guided by the literature review. The socio-demographic variables include Province where the respondent lived in 1994, highest level of completed education, population group, gender, occupation, major illnesses that they have along with tuberculosis infection, as well as income.

It is interesting to note that only two percent of the study population has diabetes. However, it is not surprising that the most popular major illness experienced was HIV/AIDS. Another interesting observation relates to the years of education, with none of the respondents having tertiary education. These observed differences will contribute significantly to the empirical analysis.

Table 4.1. TB Population Demographics, NIDS 2015

Age	Mean	42.89	
	Standard Deviation	13.57	
Population group	African	39	(89%)
	Coloured	4	(9%)
	Asian/Indian	0	(0%)
	White	1	(2%)
Gender	Male	18	(41%)
	Female	26	(59%)
Province Distribution	Eastern Cape	1	(2%)
	Free State	3	(7%)
	Gauteng	1	(2%)
	KwaZulu-Natal	6	(14%)
	Limpopo	0	(0%)
	Mpumalanga	4	(9%)
	Northern Cape	3	(7%)
	North West	1	(2%)
	Western Cape	1	(2%)
	Do not Know	23	(52%)
	Outside SA	1	(2%)
Major illness	Epilepsy/ fits	2	(5%)
	HIV/AIDS	28	(64%)
	Other	6	(14%)
	Physically handicapped	2	(5%)
	Problems with sight, hearing or speech	5	(11%)
	Psychological or psychiatric disorder	1	(2%)

	Full-time scholar	2	(5%)	
	Homemaker	5	(11%)	
	Long term sick or disabled	6	(14%)	
	Other	2	(5%)	
	Retired	2	(5%)	
Occupation	Self-employed	1	(2%)	
	Unemployed not seeking	9	(20%)	
	Unemployed seeking	8	(18%)	
	Working for pay	9	(20%)	
	No School	4	(10%)	
	12 Years	40	(90%)	
	More than 12 years	0	(0%)	
Years of Education	500 to 999	1	(2%)	
	1000 to 1999	4	(9%)	
Income				
	3000 to 3999	2	(5%)	
	Refused	37	(84%)	
Diabetes	Positive	1	(2%)	
	Negative	42	(96%)	
	Do not know	1	(2%)	

4.5.   Empirical Analysis: Results

The MCA results are reported in the Tables below as well as visualized in Figure 4.3. Table 4.2, 4.3 and 4.4 reveals the categories at three different dimensions. The tables display their coordinate values (Dimension), their contributions (Ctr), their quality of representation as defined by squared cosine (Cos^2), and a test statistic (v-test). For this analysis, the v-test statistic is calculated, this test statistic follows a Gaussian distribution which means that a value below -1,96 or above 1,96 suggests that the category is significant.

Table 4.2. Dimension 1: Determinants of subjective well-being

Population group		Dimension 1	Ctr	Cos²	v-test
	African	0.110	0.171	0.094	2.014
	Coloured	-1.044	1.584	0.109	-2.165
	White	-0.113	0.005	0.000	-0.113
Province	Eastern Cape	0.354	0.046	0.003	0.354
	Free State	-0.059	0.004	0.000	-0.104
	Gauteng	0.697	0.177	0.011	0.697
	KwaZulu-Natal	0.065	0.009	0.001	0.170
	Limpopo	0.000	0.000	0.000	0.000

	Mpumalanga	-0.726	0.767	0.053	-1.506
	Northern Cape	0.054	0.003	0.000	0.096
	North West	-0.117	0.005	0.000	-0.117
	Western Cape	-3.079	3.446	0.221	-3.079
	Do not Know	0.618	0.236	0.031	1.152
	Outside SA	0.810	0.239	0.015	0.810
Major illnesses	Epilepsy/ fits	-0.019	0.000	0.000	-0.028
	HIV/AIDS	0.044	0.020	0.003	0.382
	Other	-0.342	0.255	0.018	-0.891
	Physically handicapped	0.954	0.330	0.021	0.954
	Problems with sight, hearing or speech	0.165	0.059	0.004	0.429
	Psychological or psychiatric disorder	-1.085	0.428	0.027	-1.085
Highest Level of Education	Grade 1	-0.100	0.007	0.000	-0.143
	Grade 2	0.955	0.662	0.043	1.366
	Grade 3	0.648	0.305	0.020	0.927
	Grade 4	-0.832	0.755	0.051	-1.476
	Grade 5	-0.117	0.005	0.000	-0.117
	Grade 6	-0.449	0.073	0.005	-0.449
	Grade 7	-0.070	0.009	0.001	-0.163
	Grade 8	-0.752	1.643	0.126	-2.324
	Grade 9	0.990	1.425	0.098	2.053
	Grade 10	-0.789	0.679	0.046	-1.400
	Grade 11	0.221	0.089	0.006	0.520
	Grade 12	0.743	0.803	0.055	1.541
	No Schooling	0.187	0.051	0.004	0.388
	Do not Know	-0.615	0.000	0.028	-1.092
Highest Level of Maths Education	Grade 1	-0.100	0.007	0.000	-0.143
	Grade 2	0.955	0.662	0.043	1.366
	Grade 3	0.648	0.305	0.020	0.927
	Grade 4	-0.832	0.755	0.051	-1.476
	Grade 5	-0.117	0.005	0.000	-0.117
	Grade 6	-0.449	0.969	0.063	1.652
	Grade 7	-0.070	0.036	0.002	0.327
	Grade 8	-0.752	2.041	0.148	-2.521
	Grade 9	0.990	0.346	0.025	1.038
	Grade 10	-0.789	0.340	0.023	-0.991
	Grade 11	0.221	0.040	0.003	-0.330
	Grade 12	0.743	0.738	0.052	1.496
	No Schooling	0.187	0.051	0.004	0.388
	Do not Know	-0.615	0.000	0.028	-1.092
Strangers can be good	Do not Know	-0.410	0.244	0.017	-0.850
	Not likely	0.071	0.061	0.017	0.853
	Somewhat	-0.126	0.035	0.003	-0329
Lacked Focus					
	Moderately Rarely	0.634	1.021	0.076	1.807
Bothered		-0.385	0.968	0.102	-2.099

		Dimension	Ctr	Cos2	v-test
	All of the time	0.725	0.191	0.012	0.725
	Moderately	1.281	4.173	0.310	3.653
	Rarely	-0.573	2.865	0.394	-4.117
	Sometimes	0.339	0.500	0.043	1.360
Strangers can be trusted	I trust them a lot	-1.178	1.008	0.066	-1.685
	I trust them somewhat	0.171	0.106	0.009	0.608
	Just a little	0.109	0.090	0.011	0.681
	Not at all	-0.149	0.089	0.007	-0.563
Smoke Cigarettes	Yes	0.064	0.046	0.010	0.649
	No	-0.153	0.110	0.010	-0.649
Medical Aid	No	0.000	0.000	0.000	-Inf

Table 4.3. Dimension 2: Determinants of subjective well-being

		Dimension 2	Ctr	Cos2	v-test
Population group	African	-0.183	0.479	0.261	-3.350
	Coloured	1.623	3.868	0.263	3.365
	White	0.643	0.152	0.010	0.643
Province	Eastern Cape	-0.318	0.037	0.002	-0.318
	Free State	-0.221	0.054	0.004	-0.392
	Gauteng	-0.217	0.017	0.001	-0.217
	KwaZulu-Natal	-0.141	0.044	0.003	-0.368
	Limpopo	0.000	0.000	0.000	0.000
	Mpumalanga	-1.706	1.702	0.116	-2.232
	Northern Cape	0.384	0.163	0.011	0.682
	North West	-0.740	0.201	0.013	-0.740
	Western Cape	5.093	9.528	0.603	5.093
	Do not Know	0.217	0.006	0.001	0.187
	Outside SA		0.017	0.001	0.217
Major illnesses	Epilepsy/ fits	0.243	0.043	0.003	0.347
	HIV/AIDS	-0.143	0.210	0.036	-1.240
	Other	0.689	1.046	0.075	1.795
	Physically handicapped	0.413	0.063	0.004	0.413
	Problems with sight, hearing or speech	0.429	0.000	0.000	0.016
Highest	Psychological or psychiatric disorder	-1.066	0.417	0.026	-1.066

Level of Education	Grade 1	0.465	0.159	0.010	0.665
	Grade 2	0.867	0.553	0.036	1.241
	Grade 3	-0.217	0.035	0.002	-0.311
	Grade 4	-0.765	0.645	0.043	-1.357
	Grade 5	-0.740	0.201	0.013	-0.740
	Grade 6	0.134	0.007	0.000	0.134
	Grade 7	-0.132	0.032	0.002	-0.309
	Grade 8	0.783	1.802	0.136	2.421
	Grade 9	0.210	0.065	0.004	0.436
	Grade 10	-0.929	0.950	0.063	-1.647
	Grade 11	-0.114	0.024	0.002	-0.267
	Grade 12	-0.247	0.089	0.006	-0.512
Highest Level of	No Schooling	-0.359	0.189	0.013	-0.744
	Do not Know	-0.652	-	-	-
	Grade 1	0.465	0.159	0.010	0.665
	Grade 2	0.867	0.553	0.036	1.241
	Grade 3	-0.217	0.035	0.002	-0.311
	Grade 4	-0.765	0.645	0.043	-1.357
Maths Education	Grade 5	-0.740	0.201	0.013	-0.740
	Grade 6	0.520	0.199	0.013	0.744
	Grade 7	0.033	0.002	0.000	0.068
	Grade 8	1.072	2.533	0.181	2.793
	Grade 9	-0.086	0.016	0.001	-0.224
	Grade 10	-0.469	0.242	0.016	-0.832
	Grade 11	-0.594	0.130	0.008	-0.594
	Grade 12	-0.178	0.058	0.004	-0.417
	No Schooling	-0.359	0.189	0.013	-0.744
	Do not Know	-0.652	0.469	0.031	-1.157
Strangers can be good	Do not Know	-0.750	0.827	0.056	-1.556
	Not likely	0.104	0.134	0.036	1.252
	Somewhat	-0.086	0.016	0.001	-0.225
Lacked Focus					
	Moderately Rarely	0.274	0.192	0.014	0.780
Bothered		-0.495	1.619	0.170	-2.700
	All of the time	-0.244	0.022	0.001	-0.244
	Moderately	0.648	1.080	0.079	1.849
	Rarely	-0.147	0.191	0.026	-1.056
Strangers can be trusted	Sometimes	-0.064	0.018	0.002	-0.256
	I trust them a lot	-0.305	0.068	0.004	-0.436
	I trust them somewhat	0.940	3.245	0.260	3.343
	Just a little	-0.122	0.114	-0.762	-0.762
	Not at all	-0.567	1.299	-2.146	-2.146
Smoke Cigarettes	Yes	-0.233	0.620	0.130	-2.362
	No	0.556	1.478	0.130	2.362
Medical Aid	No	0.000	0.000	0.000	Inf

Table 4.4. Dimension 3: Determinants of subjective well-being

Population group		Dimension 3	Ctr	Cos²	v-test
	African	0.049	0.041	0.019	0.895
	Coloured	0.011	0.000	0.000	0.024
	White	-1.952	1.663	0.089	-1.952
Province	Eastern Cape	-0.497	0.108	0.006	-0.497
	Free State	-0.729	0.696	0.039	-1.293
	Gauteng	-1.461	0.931	0.050	-1.461
	KwaZulu-Natal	0.391	0.401	0.024	1.020
	Limpopo	0.000	0.000	0.000	0.265
	Mpumalanga	0.128	0.029	0.002	0.618
	Northern Cape	-1.232	1.988	0.009	-2.186
	North West	0.618	0.167	0.111	-1.236
	Western Cape	0.465	0.094	0.005	0.465
	Do not Know	0.223	0.500	0.055	1.532
Major illnesses	Outside SA	-1.236	0.667	0.036	0.465
	Epilepsy/ fits	-0.436	0.166	0.009	-0.624
	HIV/AIDS	-0.088	0.094	0.013	-0.760
	Other	-0.142	0.053	0.003	-0.371
	Physically handicapped	-2.092	1.911	0.102	-2.092
	Problems with sight, hearing or speech	0.756	1.498	0.090	1.970
Highest Level of Education	Psychological or psychiatric disorder	1.733	1.311	0.070	1.733
	Grade 1	-0341	0.102	0.006	-0.489
	Grade 2	1.881	3.091	0.169	2.692
	Grade 3	0.338	0.100	0.005	0.483
	Grade 4	1.144	1.714	0.096	2.029
	Grade 5	0.618	0.167	0.009	0.618
	Grade 6	0.281	0.034	0.002	0.281
	Grade 7	-0.832	1.509	0.089	-1.952
	Grade 8	-0.513	0.920	0.059	-1.587
	Grade 9	0.741	0.959	0.055	1.537
	Grade 10	0.422	0.233	0.013	0.748
	Grade 11	-0.297	0.193	0.011	-0.698
Highest Level of Maths Education	Grade 12	-0.570	0.567	0.032	-1.181
	No Schooling	-0.071	0.009	0.001	-0.148
	Do not Know	0.000	0.000	0.001	0.001
	Grade 1	-0341	0.102	0.006	-0.489
	Grade 2	1.881	3.091	0.169	2.692
	Grade 3	0.338	0.100	0.005	0.483
	Grade 4	1.144	1.714	0.096	2.029
	Grade 5	0.618	0.167	0.009	0.618
	Grade 6	1.411	1.738	0.002	0.281
	Grade 7	-1.209	2.553	0.089	-1.952
	Grade 8	-0.427	0.477	0.059	-1.587
	Grade 9	-0.413	0.446	0.055	1.537
	Grade 10	0.184	0.044	0.002	0.326
Strangers can be good	Grade 11	-0.078	0.003	0.000	-0.078
	Grade 12	-0.189	0.078	0.005	-0.443
	No Schooling	-0.071	0.009	0.001	-0.148
	Do not Know	0.000	0.000	0.000	0.001

Lacked Focus	Do not Know	0.787	1.081	0.000	0.032
	Not likely	0.061	0.056	0.009	-0.609
Bothered	Somewhat	-0.873	1.996	0.052	-1.494
	Moderately Rarely	-0.750	1.718	0.106	-2.139
		0.187	0.275	0.024	1.021
Strangers can be trusted	All of the time	0.327	0.047	0.002	0.327
	Moderately	0.465	0.659	0.041	1.325
	Rarely	0.215	0.484	0.055	1.545
	Sometimes	-0.728	2.779	0.199	-2.925
	I trust them a lot	0.022	0.000	0.062	1.631
	I trust them somewhat	-0.171	0.128	0.013	0.744
	Just a little	-0.238	0.521	0.120	-2.275
	Not at all	0.607	1.769	0.123	2.298
Smoke Cigarettes	Yes	-0.096	0.125	0.022	-0.973
	No	0.229	0.298	0.022	0.973
Medical Aid	No	0.000	0.000	0.000	Inf

The table below provides the values that have been used to create the MCA factor map. These values are simply the correlation ratio (eta2) between the axis and the input variables. They are the coordinate values that help us to build the plot of the squared relationships.

Table 4.5. The Correlation ratio between each category with each dimension

Categories	Dimension 1	Dimension 2	Dimension 3
Population	0.110	0.278	0.089
Province 1994	0.308	0.728	0.291
Highest Level of Education	0.407	0.294	0.500
Highest Level of Maths Education	0.420	0.336	0.548
Major illnesses	0.068	0.262	0.262
Medical Aid	0.000	0.000	0.000
Smoke Cigarettes	0.010	0.130	0.022
Trust Strangers	0.081	0.292	0.126
A stranger can be good	0.021	0.060	0.163
Bothered	0.438	0.081	0.207
Lacked Focus	0.379	0.706	0.111
Depressed	0.232	0.169	0.504
Things are hard	0.581	0.107	0.595
Hopeful	0.249	0.204	0.221
Fearful	0.461	0.023	0.401
Restless	0.210	0.617	0.265
Happy	0.097	0.050	0.217

Lonely	0.600	0.770	0.120
Cannot Self-motivate	0.572	0.758	0.181
Income	0.006	0.012	0.041
Labour status	0.386	0.236	0.140
Health Satisfaction	0.419	0.171	0.193
Diabetes	0.154	0.055	0.012

Figure 4.3 below, is a graphical representation of the previous table, lifting out the categories that had a significant impact on the respondents.

According to this map, the respondent's relations to some determinants was driven by gender. We see that female respondents suffering from TB infection were more likely to feel fear "all the time" and say that things are hard for them "all the time" when compared to their male counterparts, who hardly felt afraid and said that things are "rarely" hard for them. These findings validate what was presented in the literature review which is that women that are infected with TB tend to have a hard time due to 'felt' stigma (Hutton & Misajon, 2012). The women in this study come from disadvantaged communities and are likely to be unemployed or living just above the breadline. Therefore, these women might lack financial support from their partners or could be exposed to gender-based violence which would explain why they live in constant fear.

When considering that these women feel like things are "always hard" for them, we note that the literature review has established that being infected with TB is a costly exercise that can put strain on a household's finances (Barter, et al., 2012). This hardship is coupled by the noted fact that South African public health provisions have poor facility delivery which are serviced by deterred limited staff (Maillacheruvu & McDuff, 2014). We also saw research that public clinic staff tend to treat female patients with less empathy when compared to their male counterparts (Bates, et al., 2004). These are just some of the reasons that could result in an infected female feeling afflicted by the responsibility that this disease presents.

The MCA factor map shows that the Black African population group was the most impacted with the TB infection across both gender groups, followed by the Coloured population. Sadly, this reflects a legacy issue as during the Apartheid era the Black Africans were the most disadvantaged population, with the least resources. The Coloured communities although better resourced when compared to Black African areas, is still not in the desired conditions required to serve a TB infected population. This data visual is a reminder that the Black African

population is the largest population group in the country hence requiring more facilities and more medical professionals in their communities. If healthcare programs and policy makers want to make a more meaningful impact, they need to direct more resources to the Black African and Coloured communities in the country (Keeton, 2010).

As far as education is concerned, it was revealed that the TB population of South Africa is likely to have grade eight maths as the highest maths education level, with the odds leaning more towards the Coloured population when compared to the Black African population. In (Table 4.1.) we saw that none of the participants had tertiary education, with few having completed secondary education.

The fourth industrial revolution can be defined as the era that is concerned with building and extending the impact of digitization (Davis, 2016). Simply put we live in a time where technologies are becoming embedded within societies. There is a push for individuals to learn more about "cyber-physical systems" and most jobs require technical skills. Therefore, individuals that have little to no mathematics or science education might find it difficult to stay relevant in today's job market.

The NIDS as mentioned in the previous chapter collects data to measure the well-being of South African citizens while taking economics into account. Income dynamics play a big role in subjective well-being; hence it would be important for a collaboration to be formed between the South African Department of Higher Education and Department of Health. The collaboration should consider programs that encourage underprivileged communities to further their education with emphasis placed on mathematics and science disciplines. The great founding father of our democracy, Nelson Mandela said, "Without education, your children can never really meet the challenges they face. So, it is vital to educate children and explain that they should play a role in their country."

Due to limitations in the data, we do not see the issues of income appearing on the MCA map which would have been useful to see how it relates to education levels on a multidimensional plane.

Another useful awareness is that medical insurance was not lifted on the map hence no significant difference was found across participants. All the respondents said that they do not have medical insurance. Once again, we see that lack of medical insurance relates to poverty

and that results in poor healthcare which establishes mismanagement of TB infection and therefore lowering health-related quality of life.

Of the nine provinces we see that the Western Cape respondent is an outlier, not experiencing the same subjective well-being effects as the TB respondents in other provinces. The Western Cape coordinate is closest to the coordinates that suggests refusal to provide insights on wellbeing. This is useful information for the NIDS team as this is a longitudinal study with a set cohort and would require the respondents to participate in a more useful manner or that additional support needs to be provided in this region.

More importantly we should note that the variables with a psychological nature had the most statistically significant impact on the well-being of the South African TB respondent. This validates that TB infection is closely related to an individual's behaviour and that behaviour is a symptom of an individual's experience. This MCA map serves as a visual that suggests that in order for healthcare programs to eradicate the TB pandemic in SA, they would need to build solutions that consider variables that look at emotional health and social cohesion.
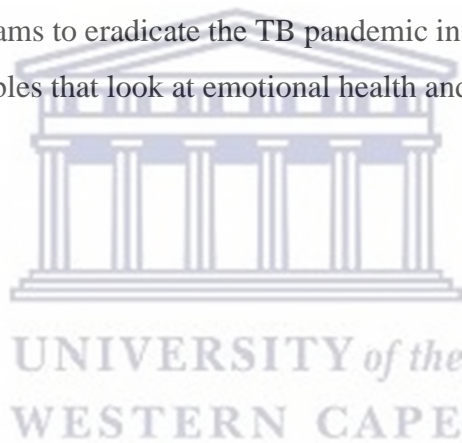
Figure 4.3. Multiple Correspondence Analysis Visualization

4.6. Chapter Summary

This current chapter made use of summary statistics, demographics and the multiple correspondence analysis factor map, to expose the interaction between multiple variables and the degree of impact that different variables can have on the subjective well-being of the TB population in South Africa. We have shed light on how these factors behave at a national, demographic, economic and social level. The next chapter is related to discussion using the findings of this chapter.

Chapter Five: Discussion of the Results

5.1. Introduction

The prevalence of TB disease in SA, presents consistently within the literature. Nevertheless, this study further explores a TB related topic, examining the impact that the disease could have on subjective well-being. The impact is measured by observing how TB disease relates to demographics and prevalence in SA.

The main aim of the study is to understand the implications of socio-economic and demographic factors that affect the HRQoL of TB infected persons in SA. Our objective was to explore how these factors disturb one's well-being, be it physically, mentally, emotionally or socially.

By using the NIDS wave four questionnaire, we explore data which provides insights on persons that are fifteen years or older. From the data, we discovered the levels of health satisfaction of TB infected adults while comparing outcomes across all nine provinces in SA.

Another main objective of this study was to unmask the infected persons, perceptions of life satisfaction and HRQoL. While considering those with other main illnesses and drawing focus on persons with TB/HIV infection. The variables that we used include: Age, Gender, Population group, Place of residence in 1994, Labour market participation, Education, Physical health, Emotional health and Social cohesion.

The investigation stems from the fact that most TB infected persons face numerous risks and burdens in their surroundings, which has a negative impact on their HRQoL and overall wellbeing. These factors tend to result in late presentation to care and could worsen the TB infected person's medical condition.

5.2. The level of Health Satisfaction in The TB population across the South Africa

In 1995, Cummins was studying the requirements for a gold standard to measure subjective well-being. When the author noted the tendency for scores from a subjective well-being tool to be negatively skewed (Cummins, 1995). This contradicts the psychological literature that uses the Pollyanna hypothesis, founded by Boucher and Osgood, who describe a universal human tendency to use evaluatively positive words (Boucher & Osgood, 1969).

The findings in this study (Figure 4.1: Chapter 4), lean towards Cummins reasoning which is that subjective well-being measures that appear to be negatively skewed relate to socially acceptable perceptions (Cummins, 1995). Showing that, the South African TB infected respondents are more likely to respond in a negative way. Due to the negative societal perception regarding the health satisfaction of TB infected persons in SA.

5.3. Attitudinal correlates of subjective well-being among TB population

In chapter two, we learnt that subjective well-being has a strong psychological undertone, paying close attention to one's attitudinal outcomes. Resilience relates to attitudinal outcomes and is defined as the psychological capacity for an individual to recover very quickly and not allow difficulties, traumatic events, or failure to overcome them (Psychology Today, 2020). Those that are resilient are able to find a way to change course and heal emotionally while remaining focused on their goals (Psychology Today, 2020).

However, recent qualitative studies have portrayed resilience as a negative attribute, as it could have ties to desensitization. These academics, arguing that consistent exposure to traumatic events in underprivileged societies could result in an emotionless response (Savahl, et al., 2014). The idea of being desensitized means an individual is unable to clearly present, judge or distinguish their true feelings around a subject.

This could be true for the study population hence explaining the overlap in ellipses (Figure 4.2: Chapter 4). For example, when the respondents were asked in the Emotional health section of the questionnaire, if they "felt happy a few weeks prior to the interview". We did not see any significant differences across the categories. This trend was seen again when respondents were asked to rate the following statements: "I felt lonely" and "I felt depressed".

5.4. Population group and subjective well-being

Based on the demographic breakdown, we saw that the study population represented the underprivileged South African. According to the summary statistics (Table 4.1: Chapter 4), 89% of TB infected respondents were of African descent, followed by 9% Coloured and the lowest proportion of Whites at 2%.

The MCA factor map (Figure 4.3: Chapter 4) confirms that within the population group variable, when focused on the TB population, it was found that South African individuals of Africans lineage have the lowest reported levels of subjective well-being.

When participants were asked to describe their health at present on a scale of excellent, to poor, the most significantly different response was "very good" and was mostly associated with Coloured respondents, this was evident in the short distance between these coordinates.

5.5.   Gender and subjective well-being

In the summary statistics (Table 4.1: Chapter 4), we saw that the majority of the respondents were females with a 59% proportion. According to the MCA factor map (Figure 4.3: Chapter 4), females overall reported lower levels of subjective well-being compared to their male counterpart which echoes what was unpacked in the literature review.

On the factor map, we see the female category landing in the same quadrant as the variable that looked at strong feelings of distrust, worry, isolation and constant agitation. These findings are in line with recent literature (Barter, et al., 2012) (van den Hof, et al., 2010). Men on the other hand experienced a much better level of health satisfaction when compared to their female counterparts. Expressing that they seldom feel alone, concerned or experiencing hardship.

5.6.   TB/HIV co-infection and subjective well-being

The study indicates that 64% of TB infected patients were co-infected with HIV/AIDS. The MCA factor map (Figure 4.3: Chapter 4), showed that most of these respondents associated with low levels of subjective well-being. This population may be dealing with 'felt' stigma in the form of lack of support from their societies (Hutton & Misajon, 2012). Although, the v-test for all major illnesses were not greater than 1.96 nor less than -1.96, therefore not significant enough to be lifted on the factor map. HIV/AIDS has a v-test statistic of -1.240 (Table 4.3: Chapter 4) which suggests a negative impact on the subjective well-being of those that are co-infected with TB and HIV/AIDS. These findings correlate with the large body of literature that propose that, living with TB and HIV/AIDS co-infection can result in sufficient distress which can substantially reduce subjective well-being (Bunn, et al., 2007) (Berkowitz, et al., 2018).

5.7.   Smoking and subjective well-being

In the second table of statistics (table 4.3: chapter 4), we notice a significant contribution to subjective well-being by the smoking category, with a -2.362 for respondents that reportedly smoke and a value of 2.362 for those that reported don't smoke. Although these values are the same, the contrasting signs speak to the impact on subjective well-being. A negative v-test statistic is inverse to an increase in subjective well-being, consequently having a harmful effect and decreasing a TB patient's HRQoL. The opposite is true, that a positive v-test statistic can help improve the subjective well-being of a TB infected individual. These findings are in line with the literature that show a strong correlation between an increased TB infection among individuals that smoke cigarettes (Groenewald, et al., 2007) (Jee, et al., 2009).

5.8.   Province and subjective well-being

Of the population that remembered where they lived in 1994, the majority of the respondents, reported living in KZN with a 67% proportion (table 4.1: chapter 4). These findings confirm the great body of knowledge which states that KZN Province carries the largest burden of disease in the country, for both TB and HIV/AIDS infection (Abdool-Karim, 2004). KZN is the more rural part of the country and is home to a predominantly disadvantaged African population, which is likely confronted with a historically weakened public healthcare system (Maillacheruvu & McDuff, 2014).

5.9.   Education, Finances and subjective well-being

According to the study findings, none of the respondents have completed education post matric (table 4.1: chapter 4), and 10% having no formal schooling experience. The MCA factor map (figure 4.3: chapter 4) shows a significant association with grade eight maths as the highest level of maths education, leaning mostly towards the Coloured population.

This is a cause for concern as the most relevant and sought-after jobs in the 21st century require individuals that have sound mathematical skills. Hence the lack of this skill has the likelihood of increasing the gap between the rich and poor populations of SA.

Lastly, the study was unable to detect how finances correlate with the participants subjective well-being as most of the respondents refused to provide information pertaining to their financial status. However, one can make an inference if using education as an indirect measure.

The previous paragraph suggests that the level of one's education, in most cases is directly correlated to his/her economic status.

5.10. Chapter Summary

The study aims to determine the subjective well-being of adult South Africans that are infected with TB. With the goal of drawing comparisons across all nine provinces in the country and identifying the main drivers of subjective well-being in the TB population. This investigation was inspired by the countless risks and burdens that this population encounter on a daily basis, with the hope that in understanding the individuals experience, healthcare programs can better support this population and therefore increase the numbers of people presenting to TB care. The goal of this research is to show that quantitative measures should be accompanied by qualitative measures hence displaying a multidimensional view of well-being by considering an individual's assessment of themselves.

SA might have free public access to treatment, however in this chapter we see that there are still a couple of factors that contribute to late presentation for TB care. We have seen that within South Africa, those that were once previously disadvantaged and live under poorly resourced conditions bear most of the burden of disease. It is clear that reasons for presentation to care are behavioural and have close relations to 'felt' stigma. If TB treatment and prevention are to be successful in SA, it is imperative to understand these factors in detail.

This analysis is not without limitations, researchers on subjective well-being mention the concept of 'life optimism bias' which refers to the tendency for scores to be negatively skewed (Cummins, 1995). This makes it difficult to see if the output is the result of socially acceptable perceptions of well-being or a true reflection of how the individual perceives their own HRQoL. Secondly the research made use of secondary data, whereby a sample was produced from the already existing NIDS cohort hence logically assuming it to be representative of the adult South African TB infected population.

Chapter Six: Conclusion and Recommendations

6.1.   Recommendations

This research set out to identify the risk factors that are associated with the subjective wellbeing of the TB infected population in SA. In doing that, we have come to identify potential problems in the data collection tool. Subjective well-being as we have come to understand is closely related to the psychological state of an individual and is meticulously linked to emotional health.

In the NIDS adult questionnaire, there is a Section K which is concerned with measuring the respondents emotional scale through the use of a four-point Likert scale. Our findings show that when respondents were asked to rate the level of fear, happiness, loneliness, depression, worry or their ability to focus. There was a lot of overlap in the sub-populations (figure 4.2: chapter 4). The Likert scale consisted of the following options: 'Rarely or none of the time', 'Some or little of the time' or 'Occasionally or a moderate amount of the time' or 'All of the time'. One could argue that 'Some or little of the time' or 'Occasionally or a moderate amount of the time' are synonymous, making it hard for the respondents to distinguish between the two, hence both categories could consist of subpopulations with similar traits.

Secondly, in this section the interviewer is quoted saying "We would like to know how your general well-being has been over the past week." I question how the respondent was able to find an average score that portrays the degree of emotion that was felt that week. Purely because feelings are used to describe a physical experience hence are able to change very quickly and behave in a fluid like manner. With that said I would recommend fewer categories in this section, in order for us to get a clearer picture of the emotional health of not only the TB population but all the South Africans that have been tasked to participate in this survey.

The NIDS as mentioned in earlier chapters is a study that has a large economic influence and explores how income dynamics interact with other variables with the aim of understanding the average South Africans quality of life. With that said, 84% of the respondents in this study refused to disclose the amount of money that they earn which is unfortunate for a survey that has a strong monetary exploration emphasis.

I would recommend that the interviewer encourages the respondents to share this level of detail as a great body of literature has shown that socio-economic factors play a huge role in an individual's subjective well-being, especially those infected with TB disease. In this study we

were unable to explore the degree of impact that finances can have on the subjective well-being of an infected TB adult South African. However, it is a feature that would still need to be investigated in the future.

6.2.   Conclusion

The NIDS is a perfect example of how the South African government is geared towards improving the lives and well-being of its citizens. It uses instruments to collect subjective data which can be used to measure subjective well-being. This research has taken the shape of a substudy, looking at the secondary data that has been collected by the NIDS with the aim of exploring gaps; to better understand the problem and to search for ways to contribute to the issue of well-being.

A subset of the sample was analysed, where we focused on South African adults who reportedly tested positive for TB. This investigation was inspired by the limited knowledge around issues of well-being and health-related quality of life where the TB infected adult South African is concerned. Through statistical analysis we unpacked the socio-economic and demographic factors that have a significant impact on the subjective well-being of TB infected adult South Africans. For the analysis, MCA was employed to observe the relationships of selected variables.

One of the research questions that was asked, was if there is a significant difference in well-being across all nine provinces. We found that the participants displayed similar trends across the country which was a general sense of dissatisfaction in health-related quality of life. However, when mining the data further and paying close attention to the more significant v-test statistics, we saw that the population group variable was a major contributor to well-being. Thus, being of African or Coloured lineage (table 4.2: chapter 4) was one of the determinants of subjective well-being. This confirms the notion that well-being has a close relationship to an individual's experience and in SA these experiences are a result of the country's socio-political landscape, social-inequality and socio-economic factors.

Another question that was explored, was whether there is a difference in life satisfaction between those co-infected with TB and HIV and those infected with only TB. The demographic output in (table 4.1: chapter 4) shows that more than sixty four percent of our sample consisted

of individuals that were co-infected with both TB and HIV. Secondly, when we observe (table 4.4: chapter 4) which provides a list of the variables that significantly contributed to subjective well-being, we see no sign of the "Major illnesses" variable. This suggests that there is insufficient evidence to show a difference in levels of well-being or health-related quality of life, when comparing individuals that are co-infection with TB and HIV to those that are infected with only TB.

Another significant contributor to the health-related quality of life of TB infected South African adults was whether they smoked cigarettes (table 4.3: chapter 4). The literature review looks at the smoking demographics in SA, placing a spotlight on the Coloured community. This type of substance abuse has negative implications on the health of a TB infected individual. Past research has also shown that there is an association between being of Coloured lineage and picking up a smoking habit. Although the government has tried to discourage this population by increasing taxes on cigarettes. It has not had a lasting impact which calls for a review on possible solutions to mitigate this risk behaviour.

The other variables that had a significant impact on the subjective well-being of the participants were attitudinal in nature. On a Likert scale the participants were asked to rate their emotional and social cohesion. When asked to measure their level of trust in society, most claimed to have an inability to trust others (table 4.3: chapter 4). It was also found that the participants tend to be bothered more often than not (table 4.2: chapter 4). This is valuable insight as this experience is likely tied to the tendency for late presentation to care or for patients to not complete treatment. This output proves that healthcare programs need to spend more time educating disadvantaged communities on the importance of completing TB treatment and above all, how to support those that are battling this disease, through social cohesion.

Although no correlations could be drawn between income and health satisfaction. We noticed that most participants had grade eight (table 4.2: chapter 4) as the highest level of completed education. This insight gives an idea of the types of jobs that the participants are likely to have and therefore the type of income. The literature shows that TB has a big impact on an individual's finances and affects the household and for that reason many poverty-stricken individuals might prioritize their livelihood rather than spend countless hours at the clinic. This is a major risk behaviour and one that the government should make every effort to correct. SA

has still not recovered from the devastation that Apartheid had on the healthcare sector, however with proper guidance in the Department of Health, the underprivileged stand a chance at good quality healthcare.

According to our findings, these are the major factors that have an impact on the subjective well-being of a TB infected South African. Suggesting that our study has important clinical and social implications. We have identified that living with TB while poverty-stricken, co-infected with HIV, lacking tertiary education and abusing substances such as cigarettes, can decrease one's subjective well-being which could result in depression, weakened immune systems and more importantly medication non-adherence. The study also draws attention to the 'felt' stigma as most TB infected adults in this study felt unsupported, this is the type of insight that public healthcare providers and policy makers can use to improve health promotion initiatives while considering social cohesion.

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Appendices

i. Age

What is your date of birth? in the following format "dd/mm/year"

Minimum age of the participant was 15 years on the day of interview.

ii. Gender

The question used to identify the participants' gender was: "What is your gender?"

The question was classified into the follow categories:

1 = Male

2 = Female

  -8   = Refused

  -9   = Don't Know

iii. Population group

The question used to determine the population group that the participant belonged to was: "What population group do you belong to?"
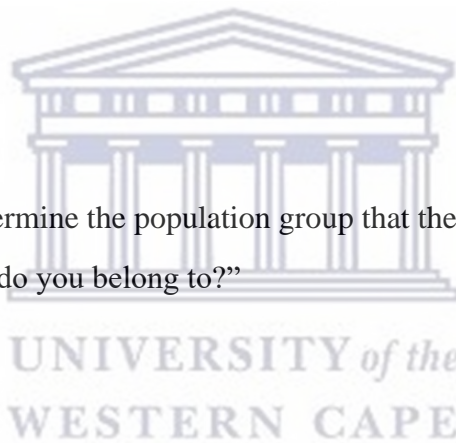
1 = African

2 = Coloured

3 = Asian/Indian

4 = White

5 = Other (specify)

-8 = Refused

-9 = Don't Know

iv. Place of residence in 1994

The question used to determine where the participant lived at the end of the Apartheid regime was: "In which Province were you living in 1994?"

1 = Western Cape

2 = Eastern Cape

3 = Northern Cape

4 = Free State

5 = Kwa Zulu Natal

6 = North West

7 = Gauteng

8 = Mpumalanga

9 = Limpopo

10 = Outside SA

99 = Do not Know

v. Labour market participation

The question used to determine the participants type of work was: "Which one of the following best describes what you were doing one year ago?"

1 = Working for pay

2 = Self-employed

3 = Working on own plot or looking after livestock

4 = Helping another family member with their business, without pay

5 = Full-time scholar or student at school, university, college or another educational institution

6 = Homemaker (looking after children / others / home)

7 = Long term sick or disabled

8 = Retired

9 = Unemployed and actively searching for a job

10 = Unemployed but not actively searching for a job

11 = Other

12 = Unpaid intern for non-family business

-8 = Refused

-9 = Don't Know

The question used to determine the participants earnings was: "What would you say last month's take home pay from this job was?

R = Amount in Rands

-8 = Refused

-9 = Don't know

vi. Education

The question used to determine the participants highest level of education successfully completed was: "What is the highest grade in school that you have successfully completed? Do not count the final year you were in school if you did not successfully complete the year." 0 = Grade R/0

1 = Grade 1 (previously Sub A/ class 1)

2 = Grade 2 (previously Sub B/ class 2)

3 = Grade 3 (Std. 1)
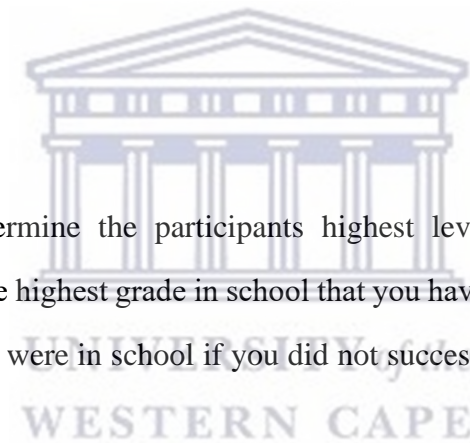
4 = Grade 4 (Std. 2)

5 = Grade 5 (Std. 3)

6 = Grade 6 (Std. 4)

7 = Grade 7 (Std. 5)

8 = Grade 8 (Std. 6/ Form 1)

9 = Grade 9 (Std. 7/ Form 2)

10 = Grade 10 (Std. 8/ Form 3)

11 = Grade 11 (Std. 9/ Form 4)

12 = Grade 12 (Std. 10 /Matric/ Senior Certificate/ Form 5)

27 = National Certificate Vocational 2 (NCV 2)

28 = National Certificate Vocational 3 (NCV 3) 29 = National Certificate

   Vocational 4 (NCV 4)

30 = N1 (NATED)/ NTC 1

31 = N2 (NATED)/ NTC 2

32 = N3 (NATED)/ NTC 3

25 = No Schooling

24 = If other, specify here

-8 = Refused

-9 = Don't Know

The question used to determine the participants highest level of mathematics education was: "What is the highest grade or level at school in which you studied mathematics? This refers to the highest grade studied, and not necessarily the highest grade passed. Incomplete years should also be included."

0 = Grade R/0

1 = Grade 1 (previously Sub A/ class 1)

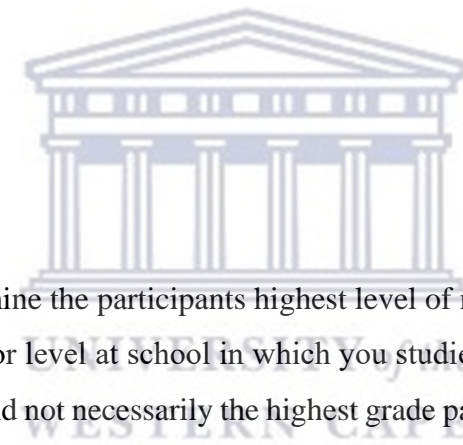2 = Grade 2 (previously Sub B/ class 2)

3 = Grade 3 (Std. 1)

4 = Grade 4 (Std. 2)

5 = Grade 5 (Std. 3)

6 = Grade 6 (Std. 4)

7 = Grade 7 (Std. 5)

8 = Grade 8 (Std. 6/ Form 1)

9 = Grade 9 (Std. 7/ Form 2)

10 = Grade 10 (Std. 8/ Form 3)

11 = Grade 11 (Std. 9/ Form 4)

12 = Grade 12 (Std. 10 /Matric/ Senior Certificate/ Form 5)

27 = National Certificate Vocational 2 (NCV 2)

28 = National Certificate Vocational 3 (NCV 3) 29 = National Certificate

   Vocational 4 (NCV 4)

25 = No Schooling

24 = If other, specify here

-8 = Refused

-9 = Don't Know

vii. Health

The question used to evaluate the participants subjective overall well-being or health related satisfaction was "How would you describe your health at present? Would you say it is excellent, very good, good, fair, or poor?"

1 = Excellent

2 = Very good

3 = Good

4 = Fair

5 = Poor

-8 = Refused

-9 = Don't Know

The question used to evaluate if the TB participants has defaulted was: "Are you currently taking medication for Tuberculosis / TB?"

1 = Yes

2 = No

-8 = Refused

-9 = Don't Know

The question used to evaluate if the participant has another major illness was: "Do you have any other major illnesses or disability not mentioned above?"

1 = Physically handicapped

2 = Problems with sight, hearing or speech

3 = Psychological or psychiatric disorder

4 = HIV/AIDS

5 = Epilepsy/ fits

6 = Emphysema

7 = Alzheimer's disease

8 = Other

-8 = Refused

9 = Don't know

The question used to evaluate if the participant has TB/Diabetes co-infection was: "Have you ever been told by a doctor, nurse or healthcare professional that you have Diabetes or high blood sugar?"

1 = Yes

2 = No

-8 = Refused

-9 = Don't Know

The question used to evaluate the participants smoking habit was: "Do you smoke cigarettes?"

1 = Yes

2 = No

-8 = Refused

-9 = Don't Know

The question used to evaluate the participants health insurance was: "Are you covered by medical aid?"

1 = Yes

2 = No

-8 = Refused -9 = Don't

Know

viii. Emotional Health

This section of the questionnaire explores the participants emotional well-being, looking over a few weeks prior to the interview. Here the participants are given a few statements to read, providing possible options of how they may have felt. The type of statements that were shared here are:

"I was bothered by things that usually don't bother me";

"I had trouble keeping my mind on what I was doing";

"I felt depressed";

"I felt that everything I did was an effort";

"I felt hopeful about the future";

"I felt fearful";

 "My sleep was restless";

"I was happy";

"I felt lonely";

"I could not "get going"

ix. Well-being and social cohesion

This section of the questionnaire explores the participants well-being in relation to their interactions with family, friends, neighbours and general social relations with those around them. The type of questions that are asked here are:

"Imagine you lost a wallet or purse that contained R250 and your contact details and it was found by someone who lives close by. Is it very likely, somewhat likely or not likely at all to be returned with the money in it?";

"How much do you trust other people you know?"