

https://dspace.org/

Depression and young mothers in South Africa: what contribution does demographic and socio-economic characteristics play?

Banda, Lucas

2020
https://hdl.handle.net/10539/30768

Downloaded from a DSpace repository. https://dspace.org/



THE SCHOOL OF SOCIAL SCIENCES
Department of Demography and Population Studies

Depression and young mothers in South Africa: what contribution does demographic and socio-economic characteristics play?

By

Lucas Banda

Student Number: 764745

A research report submitted to the Faculty of Humanities, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the Master's Degree (MA) in the field of Demography and Population Studies.

August 2020

Supervisor: Prof. Nicole De Wet

DECLARATION

I, Lucas Banda, hereby prclaim that this paper encompasses my own work. All secondary materail that has been used in this study has been carefully acknowledged and referenced according to the American Psychological Association (APA) referencing style. This paper is being submitted to the Faculty of Humanities for a Master's Degree in the academic field of Demography and Population Studies. Furthermore, I proclaim that this paper has not been submitted before in other universities for any other examination or degree purposes.

Candidate: Lucas Banda

……..

Date: 17 August 2020

DEDICATION

This paper is dedicated to first my enemies: fear, poverty, and impossibility, your presence in my life brought courage, hate for injustice and oppression brought by lack and poverty, and faith and a possibility mindset that trumps over any fear and obstacles standing my way. This paper is also a dedication to my friends and those who come from disenfranchised and disadvantaged backgrounds that with vision, goal-setting, God's grace helping you, and hard work everything becomes possible.

ACKNOWLEDGEMENTS

I would like to start by thanking my wife, Lungi for her unwavering support, love and encouragement during the most difficult times in my Master's programme. To my friends, Ben, Bix, and Zandi – you are my best friends and I thank you for all your love, understanding and support and times when I hanged out with you for laughs and fellowship.

To my supervisor and mentor, Professor. Nicole De Wet-Billings, I thank you for the opportunities you have provided for me, and for helping me make that important life-changing decision in 2018 when you encouraged me to enrol for the DPS program. If not for you, I would not be where I am – fulfilled and full of hope for the future as a demographer, a researcher and an academic. Thank you for your constant encouragement and because of you having faith in me and my capabilities, you challenged me to do what would seem impossible at the beginning of every project. Your methods of teaching and supervision are exemplary and good for emulation, and I only hope that I may contribute to the lives of other students the way that you have contributed to mine.

I would like to thank University of the Witwatersrand for the Postgrad Merit Award, which has supported me financially during the completion of this study. Also, thank you to Datafirst for providing me with the National Income Dynamic Survey data was used in the analysis of this study.

To my 'DPS' family: I would especially like to thank Miss. Khuthala Mabetha who has always been prepared to offer help in my research and studies when I desperately needed help. To my fellow Master's students, thank you for allowing me to bounce ideas off of you, for working with me and for listening.

Last and not the least, I would like to thank God for His grace over my life, which has been demonstrated over and over in my life in favours, good people surrounding my life, good health, and the intellectual capability to finish this project.

Table of Contents

DECLARATION **2**

DEDICATION **3**

ACKNOWLEDGEMENTS **4**

Table of Contents 5

Table of Figures 7

List of Tables 8

Table of Abbreviations and Acronyms 9

ABSTRACT 9

Chapter 1 introduction 11

1.1 Problem Statement 11

1.2 Justification 13

1.3 Research Question 14

1.4 Sub-Question 14

1.5 Main Research Objectives 14

1.6 Sub-objectives 14

1.7 Hypotheses 15

Chapter 2 Literature Review and Theoretical Framework 16

2.1 Depression 16

2.1.1 introduction 16

2.1.2 Depression in Sub-Saharan Africa 16

2.1.3 Depression in South Africa 17

2.2 Socio-economic and Demographic Characteristics 18

2.3 The Effects and Contribution of Depression 23

2.4 Theoretical Framework 24

2.5 Conceptual Framework 27

Chapter 3 Methodology 28

3.1 Study Area 28

3.2 Study Design 29

3.3 Data Sources 29

3.4 Study Population and Sample Size 30

3.5 Questionnaire Design 30

3.6 Study Variables 31

3.6.1 Definition of Dependent Variable 31

3.6.2 Independent Variables 32

3.7 Ethical Issues 34

3.8 Addressing the Objectives of the Study 34
3.8.1 Objective 1 34
3.8.2 Objective 2 34
3.8.2 (a) Fixed and Random Effects Models 35
3.8.2 (b) Fixed Effects 35
3.8.2 (c) Random Effects 35
3.8.3 Objective 3 36
Chapter 4 Results 40
4.1 Introduction 40
4.2 Percentage distribution of respondents by demographic and socio-economic characteristics of young mothers (15-34) in South Africa in Wave 1 and Wave 5 (2008 and 2017) 40
4.3 Depression Trend Among Young Mothers (15-34) in South Africa in Wave 1 and Wave 5 43
4.4 Cross-tabulation of Outcome Variable and all Covariates 45
4.5 Random and Fixed Effects Models 46
4.6 Hausman Test 49
4.7 Random Effects Logistic Regression Model 50
4.8 Complete Multivariate Decomposition 52
4.9 Testing of Hypothesis 55
Chapter 5 Discussion 56
5.1 Introduction 56
5.2 Discussion of Study Findings 56
Chapter 6 Conclusion 60
6.1 Conclusion 60
6.2 Strengths and Limitations of the Study 60
6.2.1 Strengths of the Study 60
6.2.2 Limitations of the Study 61
6.3 Policy Implications 62
6.4 Further Research 63

References 64

Table of Figures

Figure 2.1 CDC's Social Ecological Model Theory and Social Causation Theory/Hypothesis 26
Figure 2.2 Conceptual Framework as Adapted from CDC's Social Ecological Model, as Adapted from Brofenbrenner, and as Adapted from Social Causation Theory 27
Figure 3.1 Map of South Africa, showing all nine provinces and Western Cape Isolated Islands. The map was generated using QGIS 28

Figure 4.1 Depression Prevalence and Changes Among Young Mothers (15-34) in South Africa Between Wave 1 and Wave 5 43

List of Tables

Table 3.1 Table showing the dependent variable 31

Table 3.2 Table showing independent variables 32

Table 4.1 Percentage Distribution of Respondents by Demographic and Socio-economic Characteristics Among Young Mothers (15-34) In South Africa 40

Table 4:2 Cross tabulation of the outcome (depression) and Wave 4 covariates showing percentage distributions, p-values and chi2 of young mothers in South Africa, 2017 44

Table 4.3 Random and Effects Models 46

Table 4.4 Hausman Test 49

Table 4.5 Random Effects Logistic Regression Model with Relevant Parameters Essential for Predictive Equation of Depression Among Young Mothers in South Africa, Wave 1 and Wave 5 50

Table 4.6 Relative Contribution of Demographic and Socio-economic characteristics to Depression Among Young Mothers (15-34) in South Africa, Wave 1 and Wave 5 52

List of Abbreviations and Acronyms

AFDC – Aid to Families with Dependent Children

BDI – Beck Depression Inventory

CES-D – Center for Epidemiological Depression Scale

CSMs – Continuing Sample Members

DSD – Department of Social Development

EPDS – Edinburgh Postnatal Depression Scale

GAD – Generalised Anxiety Disorder

HSRC – Human Science Research Council

MVDCMP – Multivariate Decomposition

NYP – National Youth Policy

NIDS – National Income Dynamic Study

PHC – Primary Health Care

PND – Postnatal Depression

SAD – Social Anxiety Disorder

SADHS – South African Health and Demographic Survey

SANHANES – South African National Health and Nutrition Examination Survey

SASH – South African Stress and Health Survey

STATS SA – Statistics South Africa

TSMs – Temporary Sample Members

WMH – World Mental Health

WHO – World Health Organisation

ABSTRACT

Background

Mental illness contributes about 14% of the burden of disease in all regions of the world (Erskine et al., 2017). One of the challenges that female face is post-partum depression. Most researchers use an operational definition of postnatal depression period as lasting up to 6 months after delivery (Miller, 2002). If untreated may extend to clinical depression, which is the focus of this study.

Despite the prevalence of mental illness such as depression among youth in South Africa, studies that have examined both the effects and the contribution of demographic and socioeconomic characteristics in relation to young mothers (15-34 years) in South Africa, using a longitudinal and a nationally representative data, are on the sparse.

Youth are vital to the socio-economic development of the country, because they have more years to work to contribute to the gross domestic product of the country. Young mothers, therefore, as part of the youth cohort, play an equally important role as caregivers for the future generations (WHO, 2004). Yet, the neglected area of research is the contribution that demographic and socio-economic characteristics might play in influencing depression in the everyday life of young mothers (15-34 years) in South Africa. Thus, the study aimed to investigate the levels, effects and describe the contribution of demographic and socio-economic characteristics to depression among young mothers (15-34 years) in South Africa.

Objective

To investigate the levels of depression among young mothers (15-35) in South Africa, and the effects and the contribution of demographic and socio-economic characteristics to depression among this cohort.

Methods

This study is a retrospective longitudinal study using National Income Dynamic Study's (NIDS) Wave 1 and Wave 5. Descriptive statistics are used to track changes in different time points and to determine the prevalence of depression in both waves. Random effects logistic regression is used to determine the effects of demographic and socio-economic characteristics to depression throughout the waves. Also, a non-linear multivariate decomposition (MVDCMP) technique is used to quantify the demographic and socioeconomic factors contributing to depression.

Results

More than 20% of young mothers with one child or more have depression. The random effects results showed that being African was positively associated with increased odds of depression [OR 2,53, P-value: 0.000]. Being African also contributed to increased odds of depression by 9% [P-value: 0.000]. Age was found to have contrasting results from the two methods of analysis. Regression analysis found age to be positively associated and having an effect to depression [OR 1,05, P-value: 0.005]. Decomposition results found that age contributes to the decrease in depression among young mothers by 16,5% [P-value: 0.004]. Being unmarried was found to be a risk factor and associated with higher odds of depression [0R 1,63, P-value: 0.005]. The decomposition analysis revealed that being unmarried contributes to increased log odds of depression by 19% [P-value: 0.025]. Receiving grant, like age, had contrasting results between regression and decomposition results. Receiving grant among young mothers was positively associated with depression by a factor of 1,49 with a significance level >0.05 [OR 1,49, P-value: 0.297]. Decomposition analysis showed that receiving grant contributes to 10% decrease in depression among young mothers. Being employed was found to be a protective factor and negatively associated with depression among young mothers [OR 0,56, P-value: 0.007. Decomposition results revealed that being employed reduced depression by 39%.

Conclusion

Though young mothers, which are mostly African mothers, receive grant which contributes to taking care of their children, receiving grant is still a risk factor and is positively associated to depression because the receiving of grant help with the wellbeing of children and not necessarily impacts on the wellbeing of mothers. So, the conclusion drawn from this study is that being employed has a decreasing effect and is a protective factor against depression and contributes significantly to the decrease in depression among young mothers in South Africa.

Key words: Depression, young mothers, South Africa, decomposition, characteristics, longitudinal studies.

CHAPTER 1: INTRODUCTION

1.1 Problem Statement

Healthy youth, and in this instance healthy young mothers, is crucial for South Africa's economic and social wellbeing. It is crucial for economic well-being because young healthy women in a free and democratic country like South Africa, with equal opportunities for all, men or women, could contribute to the economy of the country. It is crucial for social wellbeing because healthy mothers can raise heathy children that can also grow to contribute to the social well-being of society.

Females have a higher rate of depression as compared to their male-counterparts, with major depressive disorder at 21% among females and 12.7% among males (Nolen-Hoeksema, 2001). Globally, women face more challenges than their male-counterparts, and this could account for high levels of depression among females (Platt et al., 2016).

One of the challenges that females face, as mothers, is post-partum depression. Most researchers use an operational definition of postnatal depression period as lasting up to 6 months after delivery (Miller, 2002). If untreated may extend to clinical or chronic depression, which is the focus of this study.

Young mothers in South Africa are increasing in number. In 2016, fertility rates at age 15-19 were 71 births per 1000 women. Fertility rates at age 20-24 were at 134 per births 1000 women. Fertility rates at age 25-29 were at 140 births per 1000 women. Fertility rates at age 30-34 were at almost 98 births per 1000 women (SADHS, 2016). Coupled with that is the fact that females in South Africa face socio-economic challenges such as unemployment and single parenting, which might lead to depression that may consequently lead to suicidal behaviours, risks the health and the contribution of young mothers to society.

There is an unemployment rate of 52.2% for youths aged between 15 and 24, and 35.5% for those between 25 and 34 (Stats SA, 2018). This problem is exacerbated among women as they are less likely to participate in the labour market (Stats SA, 2018), and overall unemployment rate for women is higher than that of men at 29,5% in the first quarter of 2018 compared to 25,3% among males (Stats SA, 2018).

Single parenthood is another problem that women face in South Africa. In a study by South African Institute of Race Relations, in South Africa, only 35% of children live with both parents,

and for those in single parent homes 40% live with their mother, and while only 3% live with their father (Holborn & Eddy, 2011). In a study by Human Sciences Research Council, 60% of SA's children have an absent father, and 40% of mothers are single parents (HSRC, 2017).

Because of the above reasons, young mothers may be prone to mental health illnesses such as chronic depression. In a country like SA, where the levels of inequality are high, being female increases the likelihood of depression even further among those who are having a child or children with no household income, or maybe have an income but not enough to take care of a child or children (Platt et al., 2016).

In a study of perceived causes of depression among South Asian origin women in Toronto, a qualitative cross-sectional study found three main factors from the participants' narratives as the causes of depression: culture and migration, socioeconomic issues, and family and relationships, (Ekanayake et al., 2012). A longitudinal study, one among the few, on income inequality and depressive symptoms in South Africa showed that age, being African, being single, being female, and having lower household income were independently associated with higher depressive symptoms (Adjaye-Gbewonyo et.al, 2016). However, the former study did not specifically focus on younger people of specific age or young mothers of South African youth category, everyone in the National Income Dynamic Study (NIDS) sample, 15 years and above, was the focus of the study. It is of utmost importance that the correlates of depression that have been identified be also quantified to help understand the challenges faced by this particular cohort. A study on decomposing perceived social status and inequalities in South Africa, comparing gender differences found that race contributed about 2% in inequalities in depressive symptoms.

The gap in the literature is that though studies have been done that focus on correlates of longitudinal analysis between poverty and depression in South Africa (Adjaye-Gbewonyo et.al, 2016) and decomposition of inequalities in depressive symptom, yet the studies that focus on young mothers and investigate the effects and factors such correlates have and their decomposed distribution on depression are in the sparse. Knowing and understanding levels of depression, the effects and contribution of demographic and socio-economic characteristics will help in having a broader perspective of the challenges faced by young mothers which will then inform even the intervention measures. Considering that there is perceived causation of depression by factors that are socio-economic amongst others, this

study then becomes significant to determine what demographic and socio-economic factors contribute to depression among young mothers in South Africa.

1.2 JUSTIFICATION

South Africa's national commitment to treating mental health problems came in a form of a legislation that was welcomed as the most progressive in the world: The Mental Health Care Act (MHCA) 2004, implemented in 2004 (Burns, 2011). However, provision and application of these policies in a form of accessible and scalable mental health services throughout South Africa, remain simply inadequate, under-funded and under-developed (Burns, 2011). And if people are not treated for depression, including young mothers, there will be a more increased burden of depression disease in South Africa.

On the other hand, depression by itself is a risk factor to suicide or self-harm causes of death, which have increased in South Africa in the period 2001 to 2010 (De Wet, 2017). On average, South African women report suffering from a countless number of somatic symptomatology of depression than their South African male counterparts (Case and Deaton, 2005). According to South African Depression and Anxiety Group (SADAG), 70% of South Africans who attempted suicide mostly had clinical depression (SADAG, 2016). Nearly 8.5 million deaths in South Africa from 1997 to 2015, were suicides and it should be noted that 9.5% of these deaths were among youth (Stats SA, 2018).

The prevalence of depression among young mothers may also impact negatively on their children. One study showed that maternal depression, particularly chronic depression, is linked to children internalizing and externalizing problem behaviours, and this subsequently worsens that behaviour of children when mothers report immediate depression (Turney, 2011). Given that damages in early childhood could position children on disadvantaged life course trajectory, early diagnosis, intervention and treatment of depressed mothers may well help amend and improve social disparities (Turney, 2011). The study by Turney suggest that boys are more susceptible to maternal depression than girls and that socioeconomic privileges do not necessarily safeguard children from the effects of maternal depression.

Youth are vital to the socioeconomic development of the country, because they have more years to work to contribute to the gross domestic product of the country. Healthy youth means a healthy economy if these young people are afforded economic opportunities and

health care. Young mothers, therefore, as part of the youth cohort, play an equally important role as caregivers who are responsible for raising future generations (WHO, 2004). Yet, the neglected area of research is the longitudinal study that looks at the levels of depression, the effects and the contribution that demographic and socio-economic characteristics might play in depression over time in the life of young mothers (15-34 years) in South Africa.

1.3 RESEARCH QUESTION

What are the levels, the effects and contribution of demographic and socio-economic characteristics in depression among young mothers (15-34 years) with one child or more in South Africa?

1.4 SUB-QUESTIONS

1. What are the levels of depression among young mothers (15-34 years) in South Africa?
2. What are the effects of demographic and socio-economic factors on depression among young mothers (15-34 years) in South Africa?
3. What is the contribution of selected demographic and socio-economic characteristics to depression among young mothers (15-34 years) in South Africa?"

1.5 MAIN RESEARCH OBJECTIVE

To investigate the levels of depression, the effects and contribution of demographic and socio-economic characteristics on depression among young mothers (15-34 years) in South Africa.

1.6 SUB-OBJECTIVES

1. To identify the levels of depression among young mothers (15-34 years) in South Africa.
2. To examine the effects of demographic and socio-economic factors on depression among young mothers (15-34 years) in South Africa.
3. To determine relative contribution of selected demographic and socio-economic characteristics to depression among young mothers (15-34 years) in South Africa.

1.7 HYPOTHESIS

H_0: There are no effects and contribution of demographic and socio-economic characteristics such as race, marital status, grant status and employment status on depression among young mothers (15-34 years) in South Africa.

H_1: There are effects and contribution of demographic and socio-economic characteristics such as race, marital status, grant status and employment status on depression among young mothers (15-34 years) in South Africa.

CHAPTER 2: LITERATURE REVIEW

2.1 Depression

2.1.1 Introduction

This chapter will review the relevant literature on depression, its levels and demographic and socio-economic characteristics that have an effect on depression and contribute to depression. Beginning with a background of depression studies done in Sub-Saharan Africa, a review research done on depression in South Africa will follow. Also, given the fact that longitudinal and decomposition studies that focus on understanding the causal effects and contribution of demographic and socio-economic characteristics are few, an overview of studies done will be offered. Therefore, by drawing attention to the work that has already been done, particularly in South Africa, it will become apparent that there is need for this study within the South African context.

2.1.2 Depression in Sub-Saharan Africa

One of the most common mental illness globally is depression. Depression is defined as an affective or mood disorder that is frequently comorbid with anxiety (Richards & O'Hara, 2014). The Diagnostic and Statistical Manual of the American Psychiatric Association lists nine possible symptoms of depression (Ingram, 2012). A diagnosis of depression is made when the person experiences at least five of the 9 symptoms of depression over a 2-week period, and one of these symptoms is either sadness or anhedonia (a lack of interest in daily activities or the ability to gain pleasure from these activities) (Ingram, 2012).

Cases of depression have increased nearly 20% in a 10-year-span, causing this debilitating condition related to suicide, the primary cause of disability all over the world (SADAG, 2016). The number of people living with depression globally, are more than 300 million, with females affected more than males (WHO, 2017). Also, in Sub-Saharan Africa mental disorders report almost 10% of the total burden of disease (Lopez et al., 2001).

Depression has been identified as one of the leading causes of disability worldwide, however in many less resourced settings in developing countries like those in Sub-Saharan Africa, less than 10% have access to mental disorder treatment (Sweetland, Belkin, & Verdeli, 2013). Also,

in Sub-Saharan Africa mental disorders report almost 10% of the total burden of disease (Lopez et al., 2001).

It has been found in developing countries that there was an association between maternal depression and global development, and that global development as an independent variable was statistically significant with p-value <0.05 [P-value: 0.01] (Weaver & Hadley, 2009). However, in many African contexts, depression or distress is mostly used to describe behavior rather than cognitive experience of a person, and in most cases it is expressed to be a somatic experience. Worry and emotions are also thought to be related to the head, heart or body instead of the head, and this may lead to misinterpretation of a person's emotional and psychological state (Sweetland, Belkin, & Verdeli, 2013).

Also, in many African countries and in their perspective, the words such as anxiety or depression have different meanings and connotations that may not necessarily have a direct effect to psychological impact or mental health and well-being. For example, in South Africa, there are numerous words that are applied to define depression that translate variously as body, heart or spirit. When a person is depressed it may be said that "umzimba uphansi" (meaning a person is depressed. Or, it may be said that "umoya wakhe uphansi" (meaning that their spirit is down). Or it may be said that "inhliziyo yakhe ibuhlungu" (meaning that the heart is sore) (Sweetland, Belkin, & Verdeli, 2013). In Lesotho, there are more than two words for depression that vary contingent on the situation (Sweetland, Belkin, & Verdeli, 2013). In such instances, where mothers are concerned, it may be discouraging for mothers to say that they are depressed, because their expression in the context of the society they live in may be misconstrued for weakness.

2.1.3 Depression in South Africa

Different studies by different scholars have been conducted in silos in South Africa in different provinces, some in clinical settings and others in schools, and all of them agree that women are most susceptible to mental illness. As mentioned earlier, studies have shown that women are more prone to suffer from mental disorders, and the mental disorder that females mostly suffer from is depression (Pillay & Kriel, 2006).

In South Africa, the small rural based study found a prevalence rate of depressive symptomatology of 18% and a rate of depression of 27% (SADAG, 2016). In the study by Pillay and Kriel on district level clinical psychology services in Pietermaritzburg, it reported rates of

21% for depression, 14% for suicidal behaviour and 9.5% for anxiety among women attending the service (Pillay & Kriel, 2006). Another study on recognition and determinants of depression, at a primary care clinic in Cape Flats, found that depressed patients tended to be younger and female, and were more likely to report somatic symptoms (Folb at.al, 2015). The study reported rates of 32% for depression and 13% for major depression.

To date, there have not been many nationally representative data on the prevalence of major depressive disorder in South Africa. The South African Stress and Health (SASH) study is the first large-scale population-based study of common mental disorders in the country (Tomlinson et al., 2009). The SASH paper provides data on the 12-month and lifetime prevalence of these conditions. It found that the prevalence of major depression was 9.7% for lifetime and 4.9% for the 12 months prior to the interviews (Tomlinson, 2009).

As mentioned earlier, some of the studies done in South Africa that focused on depression and mothers, are studies on prenatal and postnatal depression among mothers in general (Tomlinson et al., 2006).

2.2 Socio-economic and Demographic Characteristics

After the end of apartheid the government initiated a study, the National Income Dynamic Study, to be conducted to look at changes economically and in the well-being of South Africans generally in order for the government to see which areas need improvement, and how they can implement those findings into policies. And this was done because, despite the progress made and stability achieved, South Africa remains plagued by inequality. Within the country, there is still inequality with regard to demographic and socioeconomic factors such as, amongst others, race, education and employment. For example, the school completion rate of White students is more than 150% % higher than that of African students (Sibanda & Lehloenya, 2005). There are also more White people employed in the formal sector more than Africans and Coloureds, at 69.4 % and 36.9 % respectively (Michael, 2003).

Unemployment in South Africa is very high, especially among the female population. In 2014, the unemployment rate for the youth 15-34 years was at 36,1% compared to those aged 35 and above at 15,6% (Stats SA, 2015). In 2018, there was an unemployment rate of 52.2% for youths aged between 15 and 24, and 35.5% for those between 25 and 34 (Stats SA, 2018). This problem is exacerbated among women as they are less likely to participate in the labour

market (Stats SA, 2018), and overall unemployment rate for women is higher than that of men at 29,5% in the first quarter of 2018 compared to 25,3% among males (Stats SA, 2018).
As mentioned earlier, in one study on the perceived causes of depression in South Asian women in Toronto, there were 3 main factors that emerged from the participant narratives as the causes of depression: family and relationships, culture and migration and socioeconomic issues (Ekanayake et al., 2012).

In a study on postnatal depression in rural South Africa, it was found that 63% of mothers who had PND were unemployed (Stellenberg & Abrahams, 2015). Among those who were unemployed in the study, a statistical association was identified between employment and Edinburgh Postnatal Depression Scale test [P-value: 0.04], applying the Mann-Whitney and (EPDS) test and the Beck Depression Inventory (BDI), two validated self-rating questionnaires, including a questionnaire based on demographical, psychosocial and obstetrical data) (Leech, Barrett & Morgan, 2005). According to BDI test, 30.4% had severe depression while 38.5% had moderate depression (Stellenberg & Abrahams, 2015).
One of the reasons that the women in these rural settings may be experiencing high rate of depression, is because people in rural areas are staying in less resourced areas with low access to employment opportunities which has been associated to harmful health behaviours and poor somatic health results among African people (Mfenyana et al., 2006).

The turbulent and unequal past of South Africa placed other racial groups, particularly the majority of the Black community that make up the highest percentage of population of South Africa at over 80%, at high disadvantaged economic position. Though South Africa is regarded as the middle-income country (MIC), the Gini-coeffient (standard measure of inequality) is one of the highest in the world (Seidman, 2010). As such the unemployment rates are high, not only that, there is also high teenage pregnancy and single parenting in South Africa. In most cases of teens who have children, they are the ones who raise their children with the help of their parents in the absence of the child's father help. All of these are risk factors to depression among young mothers in South Africa who have to raise their children and support them physically, materially and emotionally.

In order to reduce poverty, the government introduced social grants in 1998 as a key driver in reducing poverty levels (Patel, 2012). However, there has been a number of debates whether

these social grants serve the purpose to which they were intended for, that is to alleviate poverty. The arguments made by Cootzee (2013) is that the social grants do not necessarily help in the well-being of mothers and eradicating social stressors, but in the well-being of children. In a study by Coiro (2008) among 173 low-income African American mothers who are single, using data from an ongoing study of welfare beneficiaries and their children who are at preschool age, the study determined levels and association of self-reported depressive symptomatology, and the factors that may be predicting transition away from welfare assistance. The study found that 40% of reported symptom levels were likely to point to clinical depression diagnosis. The study also ascertained that a very small number of mothers had received any mental health services. It was found out that mothers who as children had lived in households that benefited from Aid to Families with Dependent Children (AFDC), and themselves had received aid for over 5 years and supposed to have less social support were more likely to display depressive symptomatology.

Another study by Petterson and Friel (2008), assessed the validity of claims that social welfare has detrimental effect to mental health, and found that that higher levels of both depression and hopelessness among welfare beneficiaries can be described by their hardship to lack of material substance in helping support their children and themselves more accurately than the shame associated to welfare. The study showed that AFDC beneficiaries, jobless non-beneficiaries and low income or low wage group reported same levels hopelessness and depression. Finally, the study revealed that having feelings of hopelessness and depression mediated the correlation between lack of materials and depression for both those who were the recipients of the welfare and those who were not (Petterson and Friel, 2008).

Education is also regarded as one of the socioeconomic characteristics that may determine different gendered levels of depression. In a study on factors associated with depression among mothers in Los Angeles, USA, it was found that controlling for key control variables, mothers with a university degree or higher had significantly less likelihood of being depressed in comparison to mothers without a degree (95% CI, 0.29–0.86). While mothers with only teenagers in the home had significantly higher likelihood of major depression as compared to mothers with a minimum preadolescent child at home (95% CI, 1.11–2.70) Lara-Cinisomo & Griffin, 2007). One study showed that there is an inverse relationship among female's education and depression. As the level of education rises for women depression decreases more precipitously for females than for their male counterparts (Ross and Mirowsky, 2006).

However, the gender disparities in depression crudely vanishes among persons with a university degree or higher. A study by Ross and Mirowsky associated the latter convergence to two mediating factors. Firstly, education help with the increase in creativity among women than it does among men. Second, education surges the sense of being in charge of one's life and environment for both sexes on equal footing, however depression levels falloff more sharply for women as feeling of being in charge increases. The study concluded that the adulthood life trajectory pattern of levels of depression and the changes are strongly contingent on education for women more than for men.

Marital status has an influence in the mental outcome of mothers. Single parenthood is another problem that women face in South Africa. In a study by South African Institute of Race Relations, in South Africa only 35% of children live with both parents, and for those in single parent homes 40% live with their mother, and while only 3% live with their father (Holborn & Eddy, 2011). In a study by Human Sciences Research Council, 60% of SA's children have an absent father, and 40% of mothers are single parents (HSRC, 2017). In a study on postnatal depression stated earlier, one of the findings of the study was that among factors influencing the development of PND, was that most of the participants, about 63,5%, were not married. In the 'South African Stress and Health (SASH) study: 12-month and Lifetime Prevalence of Common Mental Disorders', it was found that those with a marital status: separated, widowed, and divorced had 1,5 times more likelihood to experience a 30.3% chance of lifetime prevalence of either anxiety or mood disorders, compared to those who were married. Those who were never married, were 1,2 times more likely to experience a 30.3% chance of lifetime prevalence of either anxiety or mood disorders, compared to those who are married (Herman et al., 2009).

In a country like South Africa that has history of inequality, race is a factor that can never be removed from the equation of the study of depression or socioeconomic determinants of health studies. In a study done in South Africa on "Race and Psychological Distress", it was found that the psychological distress among Africans was higher than other races: White, Coloured and Indian (Jackson et al., 2010). This status quo has been attributed to the legacy of apartheid that gave access to social capital and socioeconomic status (SES) based on race (Jackson et al., 2010). The study mentions that though apartheid officially ended in 1994,

nonetheless its legacy is apparent in the obvious racial classification in South African occupational and educational systems.

In a study on race and unhealthy bahaviors: physical and mental differences over the life course trajectory, it was found that among Whites, unhealthy bahaviors reinforced the correlation between stressors and meeting major-depression criteria. Among Black, it was found that the correlation between stressors and meeting major depression criteria was sturdier among those who had not engaged in unhealthy behaviors than among those who had (Rafferty et al., 2010). The conclusion of the study was that those who stay in habitually stressful surroundings every so often cope with stressors by means of unhealthy behaviour that may seem to have protective mental health. Yet, such unhealthy behaviors can fuse with undesirable environmental surroundings that will ultimately further aid to illness and mortality differences between social groups (Rafferty et al., 2010).

In a study on predictors of parenting among single African American mothers, it was found that higher levels of neighbourhood stress result in poorer parenting over time through its harmful effects on maternal psychological functioning. It was also found that such environmental effects that these Black African mothers found themselves in had higher psychological distress, which significantly resulted in less engagement to positive parenting practices 15 months later (Kotchick, Dorsey, & Heller, 2005).

Age is also another factor that is critical predictor of depression, as studies show that there are high levels of depression among the youth that lead to suicide. It is reported that daily, an approximately 21 South Africans (7582 every year) commit suicide and, according to experts, stress could be a significant factor influencing the phenomenon (SADAG, 2016). According to World Health Organisation, suicide is the 2nd leading cause of death among the 15-29 years with one person committing suicide every 40 second, amounting to 800 000 deaths per year (WHO, 2016). One study on the relationship between age at first birth and depression among women, suggest that the effect of age at first birth on mental health for women is curvilinear (a state where as one variable, between related variables, increases, so does the other variable, however only up to a particular point, after which, as one variable continues to increase, the other will decrease) (Carlson, 2011). In the study, it means that births at both ages (age 20 and younger) and older ages (after age 30) are being associated with mental distress (Carlson, 2011). The results in the study suggest that straying from their expected age

at first birth will most likely result in greater levels of depressive symptomatology for women in middle age who become parents both earlier and later than anticipated (Carlson, 2011).

2.3 The Effects and Contribution of Depression

It is critical to understand the correlates that have an impact and contribute to depression among young mothers in South Africa. It has been found that depression is associated with age and lack of employment. A study that looked at the relationship between depression and socio-economic characteristics in Ghana and South Africa, found that in Ghana depression is associated with younger women, compared to adults 50 years and older women, and also lack of employment. In South Africa, it was found that lack of work and lower quality of life were independently associated with depression among women in South Africa (Thapa, Martinez and Clausen, 2014). However, this study was looking at ages above youth category and was cross-sectional, showing a lack of studies that are focusing on young people ages 15-34 specifically to understand the correlates of depression.

There a number of studies that have been conducted in low and middle income countries (LMICs) controlling for compositional factors in LMICs (Burns, 2015; Chiavegatto Filho et al. (2013)), which found that in Brazil, a middle-income country with high levels of inequality, in the region of Sao Paulo, inequality such as income among the municipalities, was positively associated with depression. In a country like South Africa, where there are high levels of income inequality it is critical to understand how a socio-economic factor like income can contribute to depression among young mothers considering that women in South Africa are mostly marginalised and lack employment opportunities unlike men.

In a longitudinal study on income inequality and depressive symptoms in South Africa, age, being African, being single, being female, and having lower household income were independently associated with higher depressive symptoms (Adjaye-Gbewonyo et.al, 2016). A study with a national sample of adults was done in Indonesia, which investigated the sociodemographic factors and health risk behaviour associated with depressive symptoms in in Indonesia. The result from a multivariable logistic regression found that among both men and women, sociodemographic factors such as poor background, younger age, religiosity, unemployment, residing in Java and main islands – Java is one of the largest islands, with more

than 140 million people, and has been on transformation from rural to urban residence (Firman, 2017) – were positively associated with moderate or severe depressive symptoms.

The decomposition of the factors that are associated with depression are critical to inform policy about the magnitude of the contribution of different factors associated with depression. A recent study on gender-specific decomposition analysis, which focused on subjective social status and inequalities in depressive symptoms in South Africa found that the prevalence of depressive symptoms is significantly more pronounced in females (28.46% versus 24.38%; p= 0.011). It also found that race subjective social status (or one's perceived position in the social hierarchy) contributed to inequalities in depressive symptoms (Singh-Manoux et al., 2005; Mutyambizi et al., 2019).

It is in this context, looking at the recent two studies mentioned above that this study seeks to examine the levels of depression among young mothers (15-34) in South Africa and to investigate the effects and contribution of demographic and socio-economic characteristics to depression.

2.4 Theoretical Framework

The theoretical framework to be used in this study is the Social Ecological Model as adapted by CDC (Center for Disease Control and Prevention). The original framework of the theory is by Urie Brofebrenner where he posits that individuals' development and behaviour is impacted by his/her relationships within communities and the wider society (Brofennbrenner, 1992). The theory is also commonly referred to as the ecological/systems framework, and identifies five environmental systems with which an individual interacts (Santrock, 2009):

- **Microsystem:** Refers to the institutions and groups that most immediately and directly impact the child's development including: family, school, religious institutions, neighborhood, and peers (Kail & Cavanaugh, 2010).
- **Mesosystem:** Consists of interconnections between the microsystems, for example between the family and teachers or between the child's peers and the family (Kail & Cavanaugh, 2010).
- **Exosystem:** Involves links between social settings that do not involve the child. For example, a child's experience at home may be influenced by their parent's experiences at work. A parent might receive a promotion that requires more travel, which in turn increases conflict with the

other parent resulting in changes in their patterns of interaction with the child (Kail & Cavanaugh, 2010).

- **Macrosystem:** Describes the overarching culture that influences the developing child, as well as the microsystems and mesosystems embedded in those cultures. Cultural contexts can differ based on geographic location, socioeconomic status, poverty, and ethnicity. Members of a cultural group often share a common identity, heritage, and values. Macrosystems evolve across time and from generation to generation (Kail & Cavanaugh, 2010).
- **Chronosystem:** Consists of the pattern of environmental events and transitions over the life course, as well as changing socio-historical circumstances. For example, changing socio-historical circumstances is the increase in opportunities for women to pursue a career during the last thirty years (Kail & Cavanaugh, 2010).

CDC uses a four-level social-ecological model to better understand violence and the effect of potential prevention strategies. The model as used by CDC take into consideration the relative interplay between individual, relationship, community, and societal factors. The model in CDC's context allows one to comprehend an array of risk factors that put people at risk for violence or protect them from undergoing or performing acts of violence.

The second theoretical framework used for this study social causation theory/hypothesis, which posits that negative social and economic conditions, such as increased exposure to violence, increased adversative life events such as negative income shocks, financial stress, income insecurity, food insecurity, lower education and reduced resources to protect individuals from the consequences of adverse life events, will increase the increase risk for mental illness. So, for this study, the CDC's social ecological model and social causation hypothesis were merged.

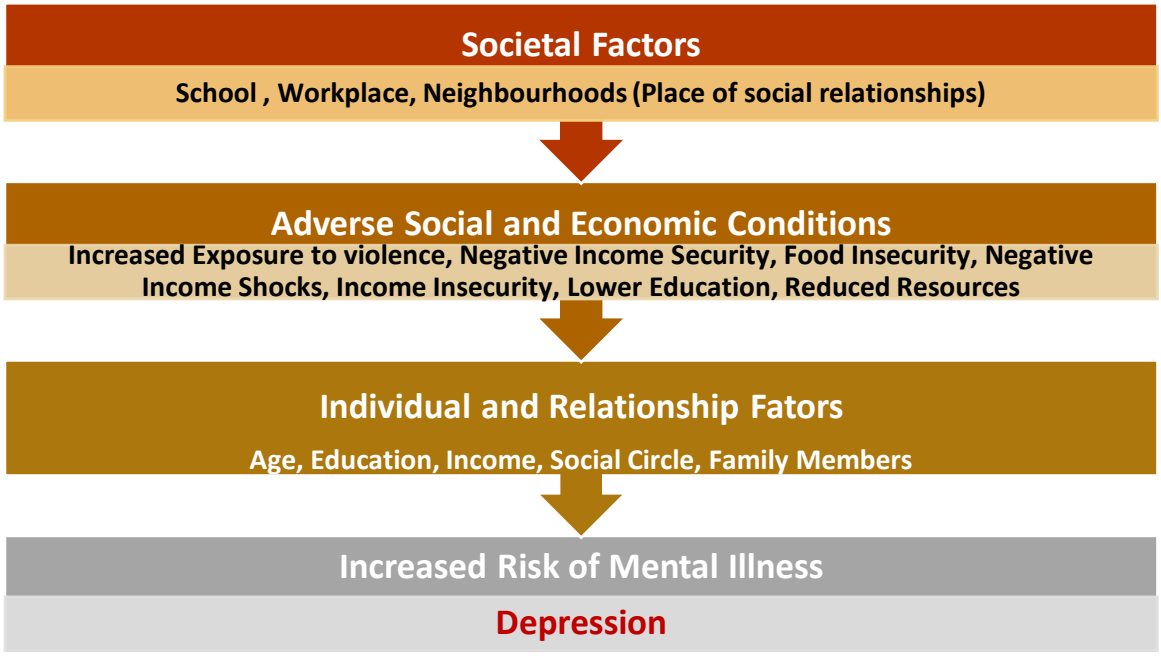

Figure 2.1: CDC's Social Ecological Theory and Social Causation Theory/Hypothesis (CDC, 2020; (Dohrenwend et al., 1992).

The above theoretical framework shows factors adopted from the social causation model are adverse and social conditions such as: Increased exposure to violence, negative income security, food Insecurity, negative income shocks, income Insecurity, lower education, reduced resources. It also shows the factors to be examined, as adopted from the social ecological model framework, such as individual, relationship and societal factors: age, education, income, social circle and family members and place of residence respectively.

2.5 Conceptual Framework

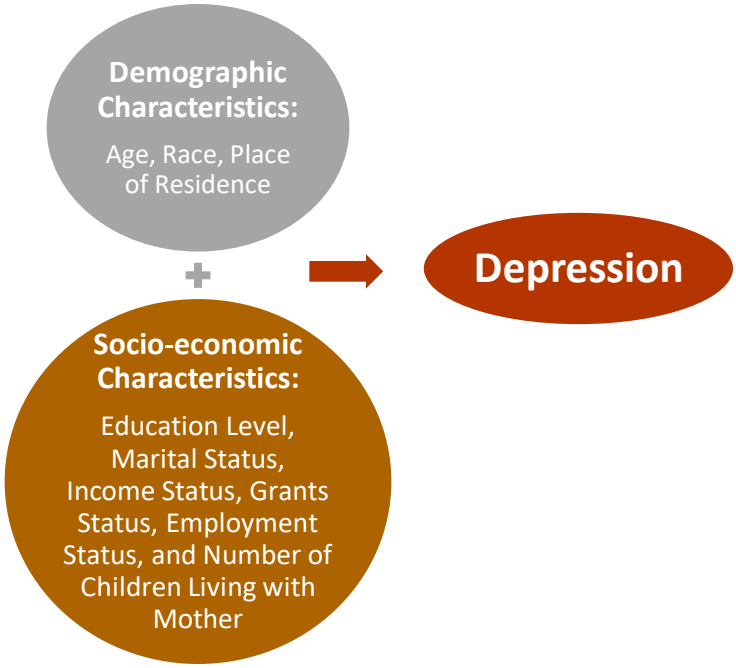

Figure 2.2: Conceptual Framework as adapted from CDC's Social Ecological Model (CDC, 2020), as adapted from Brofenbrenner (1992), and adapted from Social Causation Theory (Dohrenwend et al., 1992).

The conceptual framework for the study is adapted from the CDC's Social Ecological Model and Social Causation Theory, where it recognised that health outcomes are dependent on individual and relationship factors, and that there are demographic and socio economic factors that are may be deem to have an effect to health outcomes.

At individual level, demographic factors such as one's age, race and place of residence could have an effect on and contribute to depression. On the other hand, the socio-economic factors such as education level, marital status, income status, grant status and number of children living with the mother may also have a contribute to depression.

CHAPTER 3: METHODOLOGY

This chapter presents an overview of the study area, study design, data sources, study population and sample, questionnaire design, study variables used in the analysis, ethics, and variables used in the analysis. In addition, a detailed description of the analysis conducted in order to meet the study objectives is presented.

3.1 Study Area

South Africa has been selected as the study region for this study. The country is situated in the bottom most area of Sub-Saharan Africa. Its neighbouring countries include Swaziland Botswana, Lesotho, Mozambique, Zimbabwe, and Namibia. The country has nine provinces in with a mid- year population estimates for 2011, at 50,59 million people (Statistics SA, 2011). According to the national 2016 mid-year population estimates by Statistics South Africa, it was estimated that South African population was approximately 58,780, 000 (Stats SA, 2019).

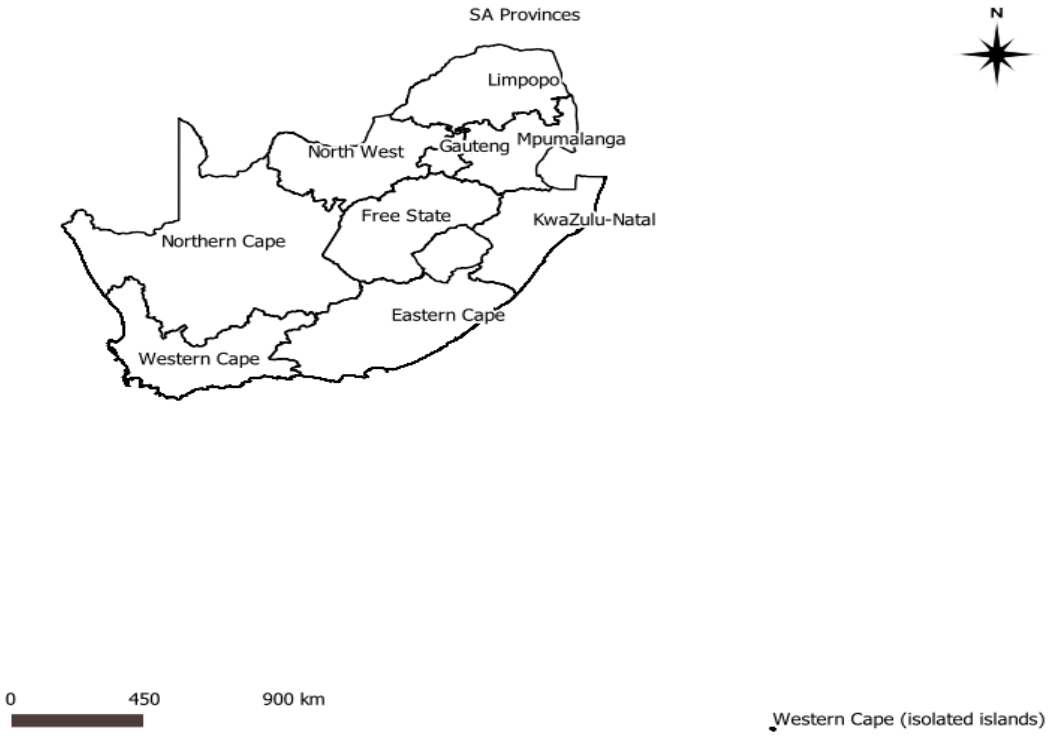

Figure 3.1: Map of South Africa, showing all nine provinces and Western Cape Isolated Islands. The map was generated using QGIS.

South Africa has a fascinating and thought-provoking politically tempestuous past, as such this study finds its background and foundation on the realities of the unequal society that is a

progeny of the past. Racial discrimination plagued the country for decades and, in 1994, South Africa was declared a democracy. Since the end of Apartheid which fostered an unequal society, South Africa has enjoyed a prosperous economy and a peaceful political period. However, there has been an increasing burden of non-communicable diseases (NCDs), including mental health illness such anxiety, substance abuse and depression among the youth in South Africa, notwithstanding their varying geographical locations (whether province or place of residence – urban or rural).

After the end of apartheid the government of South Africa, in its bid to commitment to treating mental health problems legislated what was dubbed: The Mental Health Care Act (MHCA) 2004, implemented in 2004 (Burns, 2011). Yet, there has not been practical health intervention programmes designed to address this huge scourge that is negatively impacting the youth (Burns, 2011). If there are not programmes at hand and people are not treated for depression, including young mothers, the burden of disease will continue to escalate. And if people are not treated for depression, including young mothers, there will be a more increased burden of depression disease in South Africa.

3.2 Study Design

This study is a retrospective longitudinal study using National Income Dynamic Study's (NIDS) Wave 1 and Wave 5, to track changes in different time points to determine, using random effects logistic regression to see the individual effects of demographic and socio-economic characteristics to depression on the same respondents. Using longitudinal data is helpful in determining if there are changes over time in relation to the dependent variable (depression) on the same respondents in the study, and to determine the relational effects of demographic and socio-economic characteristics on depression among young mothers (15-34) in South Africa.

3.3 Data Source

The data used for this study is pooled data sets from the NIDS Wave 1 (2008), and Wave 5 (2017) (Datafirst, 2018). The NIDS is used to track changes in incomes, expenditures, assets, access to services, education, health and other dimensions of well-being of South Africans

over time (Leibbrandt et al., 2009). The sample of the data is 10% of the population and the sample weight was created to be nationally representative (Brophy et al., 2018). The study commenced in 2008 with a nationally representative sample of more than 28,000 persons in 7,300 houses across the country (Brophy et al., 2018). The study continues to recur every two years with these same members of selected households. These are called Continuing Sample Members (CSMs). Any other member who becomes part of the household is accordingly interviewed however not tracked in the subsequent waves (Brophy et al., 2018). These are called Temporary Sample Members (TSMs). All children that are born to CSM mothers become an addition to the sample of CSMs and they are followed. Due to attrition of White, Indian/Asian and high-income respondents, a Top-Up sample was added at Wave 5 to conserve the sample representativeness. Over-all, 2 775 CSMs were added as a consequence of the Top-Up (Brophy etal., 2018).

3.4 Study Population and Sample Size

In this study, at baseline, wave 1, the sample size was 4998 (15-34-year-olds) and after choosing and adding the variables of interest the sample size was reduced to 934, young mothers, unweighted. The reason why not all the waves were used is because the time frame of the waves is two years apart, which is too short to see significant changes over time in the outcome of interest. At least 10 years was enough to see the true reflection of levels of depression, and how demographic and socio-economic characteristics effect and contribute to depression among young mothers in South Africa.

3.5 Questionnaire Design

The NIDS has Adult and Individually Derived data sets for adults 15+ years. This has questions from which all variables in the study come from such as labour market participation, social grant, household income, race, age, geo-type or place of residence, education, number of children, and depression, and all these are pertinent variables for the current study. Weights for NIDS are calculated using the appropriate mid-year population estimates from Statistics SA (Brophy et al., 2018). The mid-year population estimations have used the updated provincial boundaries since 2007. However, NIDS at first reported provincial boundaries as

they showed in the sample originally provided by Stats SA, which mirrored the 2001 boundaries (Brophy et al., 2018). All calculations for weight in all the waves were updated to utilise the 2011 Census borders. The outcome is that nearly all weights changed marginally. Although individual cases could have shifted by seemingly substantial quantities, generally changes seem insignificant (Brophy et.al., 2018).

3.6 Study Variables

3.6.1 Dependent Variable

The dependent variable for the study is depression. In defining depression levels, a Center for Epidemiological Studies Depression Scale 10 (CES-D-10), a short self-report scale designed to measure depressive symptomatology in the overall population, and found to have exceptionally high internal consistency and high adequate test-retest repeatability (Radloff,1977), was used to determine the categorisation of depression likelihood. In order to determine how the person has been feeling or behaved for the past few days, a ten-item score with the following responses: rarely or none of the time (less than 1 day); some or a little of the time (1-2 days); occasionally or a moderate amount of time (3-4 days); and all of the time (5-7 days), is given (Radloff, 1977). A score of 10 or greater is considered depressed. Every item in the depression scale was first generated and then recoded in Stata, after which the CESD was generated and coded 0 or 1, and then recoded in Stata to generate a dichotomous variable: depressed or not depressed.

Table 3.1 Table showing Dependent Variable

Dependent Variable	Definition	Variable Category
Depression	Depression is a feeling of loneliness and feeling distressed for number of days (at least 2 weeks), categorised as:	Binary Not Depressed (0), Depressed (1)

3.6.2 Independent Variables

The independent variables for the study are age, place of residence, race, marital status, level of education, grant status, employment status, and number of children the mother has, and household income, .

Table 3.2 Table showing Independent Variables

Independent Variables	Definitions	Recode	Variable Category
Age	Based on the youth age in years in South Africa. Age refers to the age group of the study population, who were 15 to 34 years at the time of interview	15,16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34	Numeric
Place of Residence	Refers to the area of residence	Urban (1), Rural (2)	Categorical
Race	Refers to the population group of the respondents	Non-African (1), African (2)	Categorical
Marital status	Refers to the status of relationship union of the respondents	Not Married (1) and Married (2)	Categorical
Level of Education	Refers to the level of learning that the respondents have been able to attain	Primary (1) High (2)	Categorical
Social grant status	Refers to whether the mother receives the government support to receive grant for the child or children or not	Not Receiving Grant (1) Receiving Grant (2)	Categorical
Employment Status	Refers to the status of employment of the respondents	Unemployed (1), Employed (2)	Categorical
Number of Children a Mother Has	Refers to the number of children that the respondent has and used in the decomposition analysis. For it to be used in the decomposition analysis, it is required that it is coded as 0 and 1.	1 Child (0) or 2+Children (1) 1 Child (0) or 2+Children (1) (coding for decomposition)	Categorical

Household Income	Household Income refers to the income that comes in the house after tax	R1000-R2000(1) R2015-R3000 (2) R3040-R4000(3) R4095-R5000 (4) R5056+ (5)	Categorical

After choosing the variables of interest, data was formatted to show the observations in a long format (vertically for each respondent). After that a group variable to accommodate all waves for each of the variables that would show data as panel and displaying observations for every respondent in different waves in long format, was created to help implement panel logistic models for analysis. Then after each variable was recoded.

In creating the age variable all ages less than 15 and above 34 were dropped. The reason ages 15-34 were chosen for the study on young mothers is because the youthful age in South Africa is 15-34 years (NYP, 2015). The age has been categorised as a numeric variable. Place of residence was originally categorised as traditional, farms and urban according to the geographical categorisation by Statistics South Africa, 2011. In this study it was categorized as urban (recoded as 1) and traditional and farms were grouped and renamed rural (recoded as 2). The race variable was recoded as Other Races, combining all the other races because of small observations for these categories and (recoded as 1) and African (recoded as 2).

Marital status in the original data had groups listed as married, living with partner, widow/widower, divorced and never married. All those living with partner, the widowed, the divorced and the never married were grouped together and categorised as married (recoded as 1) and those unmarried (recoded as 2).

The level of education was categorised as primary (recoded as 1) and secondary (recoded 2), with higher education merged with high school and no schooling merged with primary because of fewer observations from higher education and no schooling. Those who receive social grants were grouped as not receiving grant (recoded as 1) and those receiving social grant (recoded as 2). The employment status was categorised as unemployed (recoded as 1) and employed (recoded as 2).

The main predictor variable: the number of children the mother was recoded as (0) for those with one child and (1) for those with two or more children, and was used for a decomposition analysis as it is required when decomposing the main predictor that it is coded as (0) and (1). This means the decomposition method sought to determine the difference between the indicator variable (observations) that take on the value of 1 and shows higher outcome (group

A) and the indicator variable that take on the 0 value and shows lower outcome (Sinning et al., 2008). The main predictor, the number of children the mother, was also recoded as (1) for those with one child and (2) for those with two or more children, and was used for a regression analysis.

The household income was grouped and categorised as the following: R1000-R2000 (recoded as 2), R2015-R3000 (recoded as 3), R3040-R4000 (recoded as 4), R4095-R5000 (recoded as 5), and R5056+ (recoded as 1 to use as reference category).

3.7 Ethical Issues

Secondary survey data was employed in this study. The surveys were conducted anonymously, therefore the identity, names and other personal information of the respondents were not revealed in the datasets. Though ethical clearance was not required to conduct this study, however permission to use data was acquired. Datafirst website, administered by University of Cape Town, was used to acquire the data (https://www.datafirst.uct.ac.za). First, it was required to register as a user, then get permission by giving brief summary of what the research is all about. It was only after that process that access to dataset was granted. Also, ethics waiver had to be applied from the Faculty of Humanities and after the review process, the following student protocol was granted: WDEMG2019/07/07.

3.8 Addressing Objectives of the Study

3.8.1 Objective 1: To answer the first objective, first, a graph was used that showed the levels of depression at both waves of focus in the study: Wave 1 and Wave 5. Secondly, a table was also used to tabulate the demographic and socioeconomic distributions of young mothers (15-34) in South Africa at baseline, Wave 1.

3.8.2 Objective 2: The second objective of this study was to determine the effects of demographic and socio-economic factors on depression among young mothers (ages 15-34 years) in South Africa. First, a table was used that showed cross-tabulations of the outcome variable (depression) and covariates showing percentage distribution, p-values, and chi2. Then a table showing the random effects and fixed effects was used, followed by a table that shows Hausman's test results to determine which test to use for analysis.

3.8.2 (a) Fixed and Random Effects Models

3.8.2 (b) Fixed Effects Model

In panel data analysis the following general model is used for fixed and random effects models:

$$\gamma_{it} = \beta_0 + X_{it}\beta + Z_{i\gamma} + a_i + e_{it}$$

where γ_{it} is an intercept,
where β_0 is the slope coefficient,
where $X_{it}\beta$ are independent variables for individuals,
where Z_{it} are time-invariant factors for individuals,
where a_i are individual effects,
where e_{it} is the error term.

A fixed effects logistic regression model was used in the study to test if the model was the appropriate one for the panel data analysis. The fixed effect assumption is that the individual specific unobserved effect (α_i) is correlated with the independent variables. The model for fixed effects model is expressed as follows:

$E(\alpha_i | X_{it}, Z_i) \neq 0$: meaning

the expected value of individual effects
given (|) the values of x of an individual with time-variant and time-invariant features
where α_i is the unobserved individual specific effects,
where X_{it} is the individual independent variables with a time-variant feature for each respondent,
where Z_i is time-invariant factors observed and cannot be estimated by fixed effect model, but can be estimated by random effect model.

Source: Heddeker & Gibbons, 2006

3.8.2 (c) Random Effects Model

Then a random effects logistic regression model was also used for analysis. The random effects assumption is that the specific individual effects are uncorrelated with the independent variables, so that there is no correlation with the independent variables. Coefficients of all variables in the model, time-variant and time-invariant, will be estimated. In the random effects model, there is no fixed individual specific effect. The random effect model is expressed as follows:

$E(\alpha_i | X_{it}, Z_i)=0$:

where α_i is the unobserved individual specific effects,
where X_{it} is the individual independent variables with a time-variant feature for each respondent,
where Z_i is time-invariant factors observed and cannot be estimated by fixed effect model, but can be estimated by random effect model.

Source: Heddeker & Gibbons, 2006

In a random effects model the individual effect (α_i) and the error term (e_{it}) will be combined. Basically, the individual effect (α_i) is included in the error term (e_{it}). So, we do not need to take differences (create lags) and all variables, despite their time variability, they will included in the model. Both fixed and random effects models used in this study do not necessarily look for causality, but look for relational effects of the individual characteristics over time. Random and fixed effects models estimate relationships while modelling difference in outcomes owing to lower-level factors across study population (N) and time (T) versus higher-level factors across N (Zyphur et.al, 2019). Accordingly, integral in this method is handling the data as if they were a collection of time (T) cross-sections. In summation, these models also called static models, the models that do not stipulate dependence of the future on the past (meaning, exclusion of lagged effects) and control for unit effects (Hsiao, 2014). However, they are weak in conforming to the logic of causality, such as temporal precedence, and thus create practical modelling issues of dynamic causal effects over time (Zyphur et.al, 2019).

Finally, a Hausman's test is used to determine which statistical model to use between fixed and random effects models. The Hausman's test states in the:

H_0: that random effects is the appropriate model and that in the
H_1: Fixed effects is appropriate.

In order to choose the appropriate test, the Wald chi-square is not necessarily the determining factor in the higher chi-square produced by either models (Allison, 2005). The rule of thumb in choosing the test is that if the p-value of the Hausman test is <0.05 we reject the H0 in favour of H1. However, if the p-values is >0.05 random effects method is the appropriate model to use (Amini et al., 2013).

3.8.3 Objective 3: The third objective of the study was to determine relative contribution of selected demographic and socio-economic characteristics to depression (at Wave 5) among

young mothers (ages 15-34 years) in South Africa. As such, the multivariate decomposition analysis was used in answering the third objective.

A table that showed a full multivariate decomposition in proportion of endowments or characteristics effects to depression mong mothers with one child or more in South Africa, was used.

Demographers normally separate demographic variables such as place of residence, sex, age, and other socio-economic variables that will explain the event being studied. In doing so, it is simple to analyse the effect each component has on the event studied or the whole dynamic. The study that seeks to understand the effect of each component on the outcomes studied is known as decomposition technique. However, there are different decomposition methods that focus on either linear regression or non-linear methods (Bazen et al., 2016).

Multivariate decomposition (MVDCMP) technique is used widely in social research to aid in computing the relative contribution to group differences from multivariate models. The method uses the output of the regression models to partition the components of group differences from a statistic, whether or a proportion mean, into components that are ascribed to differences between groups in endowments or characteristics, and a component ascribed to differences in effects or behavioural responses (Powers et al.,2011). The researcher may be interested in explained component (the endowments) or unexplained components (coefficients effects). The unexplained component is difficult in the interpretation of the results (Fairlie, 2006), and thus this study focused on the explained component instead of the unexplained.

In contrast to the decomposition of the linear model, a non-linear decomposition model is sensitive to the sequence in which independent variables go into the decomposition, and this problem is referred to as “path dependence”. MVDCMP is intended for use in the non-linear decomposition and it is founded on recent contributions, which include ways of overcoming or handling path dependence and prevailing over identification problem related with a choice of a reference category in cases where dummy variables are incorporated in the model (Powers, Yoshioka, & Yun, 2011). MVDCMP is also equivalent to other Stata packages fairlie, nldecompose, and Oaxaca; and runs a full detailed decomposition with both endowments, standard errors and coefficients effects (Powers et al., 2011).

The multivariate decomposition technique used in this study is the suitable analytical method to help identify and quantify the factors of the change in depression levels among young mothers. Accordingly, the equation used for this study follows the mapping function for logistic regression and is expressed thus:

$$Y = \left(F\left(\frac{e^{X\beta}}{1 + e^{X\beta}} \right) \right)$$

where F is any once-differential function mapping a non-linear combination of $X(X\hat{\beta})$ to *Y* where $^{X\beta}$ denotes the log odds of 1 divided by the probability of 1+1 = 0.5. Therefore, the log odds is equal to 0 when the probability of 1 response is equals to 0.5 (Heddeker & Gibbons, 2006).

Consider the probability of depression among young mothers (15 – 35) in South Africa, which depends on many explanatory variables (X), where one is either depressed or not depressed. The odds ratio for depression (holding all other variables constant) is the odds for (depression = 1) divided by the odds for (non-depression = 0) (Norton et al., 2004). This means the method sought to determine the difference between the indicator variable (observations) that take on the value of 1 and shows higher outcome (group A) and the indicator variable that take on the 0 value and displays lower outcome (group B) (Sinning et al., 2008). The contribution of each variable to the difference among mothers with one child or more is thus equal to the average predicted probability from replacing the distribution of mothers with one child with the distribution of mothers with more than one child while holding the distribution of other variable constant (Fairlie, 2006).

The proportional difference in Y between groups A and B can also be decomposed as follows:

$$\bar{Y}_A - \bar{Y}_B = F(X_A \hat{\beta}_A) - F(X_B \hat{\beta}_B)$$

$$= \{F(X_A \hat{\beta}_A) - F(X_B \hat{\beta}_A)\} + \{F(X_B \hat{\beta}_A) - F(X_B \hat{\beta}_B)\} \; (X_A \beta_A)$$

E	*C*

The portion labelled E denotes the component of the difference that is attributed to endowments, also known as explained component. The C portion is ascribed to the component of the difference that is attributed to coefficients or effects, also known as coefficients effects or unexplained component. As such, for both models – linear and logit –

the observed respective difference in group means and proportions, is additively decomposed into endowments component and coefficient effects component. In this instance, Group A has been allocated as a comparison group and group B as the reference group. Consequently, E mirrors the conditional comparison of the difference in outcomes from group A's outlook (simply, the expected difference if group A was given the same distribution of covariates from group B). C reflects a hypothetical comparison of outcomes from group B's outlook (simply, the expected differential if group B experienced group A's risks to X – explanatory variables).

Chapter 4: RESULTS

4.1 Introduction

This chapter provides the baseline sample descriptive statistics table of young mothers (15-34 years) with one child or more in South Africa by individual characteristics at both Wave1 and Wave 5. Secondly, a graph presenting the trend of depression distribution among young mothers (15-34 years) across 2 waves, Wave 1 and Wave 5, is shown. Third, a table showing cross-tabulation of dependent and all independent variables and their chi-square has also been presented. Fourth, the table of random and fixed effects results is presented, and then another table that displays a Hausman test results from the stored estimates of the two models is presented to determine which model to use for analysis of the study. Fifth, a chosen model table of results is displayed and interpreted. Lastly, a table showing a multivariate decomposition between socio-economic and demographic characteristics at play in depression among young mothers with one child or more in South Africa is showed and interpreted.

4.2 Percentage Distribution by Demographic and Socio-economic Characteristics

The table below shows the percentage distribution of respondents by demographic and socio-economic characteristics

Table 4.1: Percentage distribution of respondents by demographic and socio-economic characteristics of young mothers (15-34) in South Africa in Wave 1 and Wave 5 (2008 and 2017).

Wave 1				**Wave 5**			
Demographic Characteristics	**Total Number of Mothers**	**Subtotal Number of Mothers**	**%**	**Demographic Characteristics**	**Total Number of Mothers**	**Subtotal Number of Mothers**	**%**
Sex				**Sex**			
Females	**934**		**100**	Females	**934**		**100**
Age (in years) 15-34	**934**			**Age (in years) 24-44**	**934**		

Place of Residence	**934**			**Place of Residence**	**934**		
Urban		496	53.10	Urban		488	52.25
Rural		438	46.90	Rural		446	47.75
Total		**934**	**100**	**Total**		**934**	**100**
Race	**934**			**Race**	**934**		
Other		724	77.52	African		724	77.52
African		210	22.48	Other		210	22.48
Total		**934**	**100**	**Total**		**934**	**100**
Socio-economic Characteristics	**934**			**Socio-economic Characteristics**			
Marital Status				**Marital Status**			
Married		306	32.76	Married		412	44.11
Not Married		628	67.24	Not Married		522	55.89
Total		**934**	**100**	**Total**		**934**	**100**
Child Grant				**Child Grant**			
Receiving Grant		606	64.88	Receiving Grant		748	80.09
Not Receiving Grant		328	35.12	Not Receiving Grant		186	19.91
Total		**934**	**100**	**Total**		**934**	**100**
Employment Status	**934**			**Employment Status**	**934**		
Employed		344	36.83	Employed		464	49.68

Unemplo yed		590	63.17	Unemplo yed		470	50.32
Total		**934**	**100**	**Total**		**934**	**100**
Education Level	**934**			**Education Level**	**934**		
Primary		146	15.63	Primary		98	10.49
High School		788	84.37	High School		836	89.51
Total		**934**	**100**	**Total**		**934**	**100**
Household Income	**934**			**Household Income**	**934**		
R1000-R2000		596	63.81	R1000-R2000		596	63.81
R2015-R3000		154	16.49	R2020-R3000		154	16.49
R3040-R4000		60	6.42	R3040-R4000		60	6.42
R4095-R5000		42	4.50	R4095-R5000		42	4.50
R5056+		82	8.78	R5056+		82	8.78
Total		**934**	**100**	**Total**		**934**	**100**

Table 4.1 shows the percentage distribution of the demographic and socio-economic characteristics of the respondents at the base line in Wave 1 and Wave 5. The table shows that the sex of the respondents is female and their age variables is in years from 15-34 years at the baseline and 24-44 at subsequent wave.

The results in the table show that at Wave 1, 46,90% of the respondents are from urban areas, with 53,10% residing in rural areas. While in Wave 5, 52,25% reside in urban areas with 47,75% residing in rural areas. The results also show that both Wave 1 and Wave 5 have Other Races with a percentage distribution of 22,48% compared to the African population groups with a percentage distribution of 77,52%.

Table 4.1 also shows that those who are married in Wave 1 are by far less than those who are not married at 32,76% and 67,24% respectively. In Wave 5 the distribution changed drastically with the married at 44.11% and the unmarried at 55,89%. Table 4.1 shows that at Wave 1 there are 64,88% young mothers receiving child grant distribution, while those who are not receiving child grant have a percentage distribution of 35,12%. At Wave 5 there are about 80,09% recipients of child grant, while only 10,09% are not receiving any form of child grant.

The results above show that those who are employed at Wave 1 make about 36,83%, while those who are not employed make about 63,17%. At Wave 5 there are 49,68% and 50,32% are unemployed. At Wave 1 the education level at primary has percentage distribution of about 15,63%, while those with a high school education make up 84,37%. At Wave 5, those with primary education have a percentage distribution of 10,49% with 89,51% distributed to those with high school level of education.

Those young mothers in a household income of R10000 to R2000 make up 63,81% of the total percentage distribution. There is about 16,49% of the respondents in households with an income between R2010-R3000, while young mothers in house with an income between R3050-R4000 make up about 6,42%. The results also show that young mothers with a household income of R4100-R5000, have a percentage distribution of just about 4,50%, while those in household with an income R5056 and above have a percentage distribution of about 8,78%. The table above shows that those of 'Other' religious affiliations make up about 12,21%, while those of Christian religion make a percentage distribution of 87,79%. The amazing thing with the results of income at both Wave 1 and Wave 5 is that household income has not changed over time. The results show same distribution over time.

4.3 Depression trend among young mothers (15-34) in South Africa from Wave 1 to Wave 5

The following graph shows the trend of depression prevalence among young mothers (15-34) in South Africa.

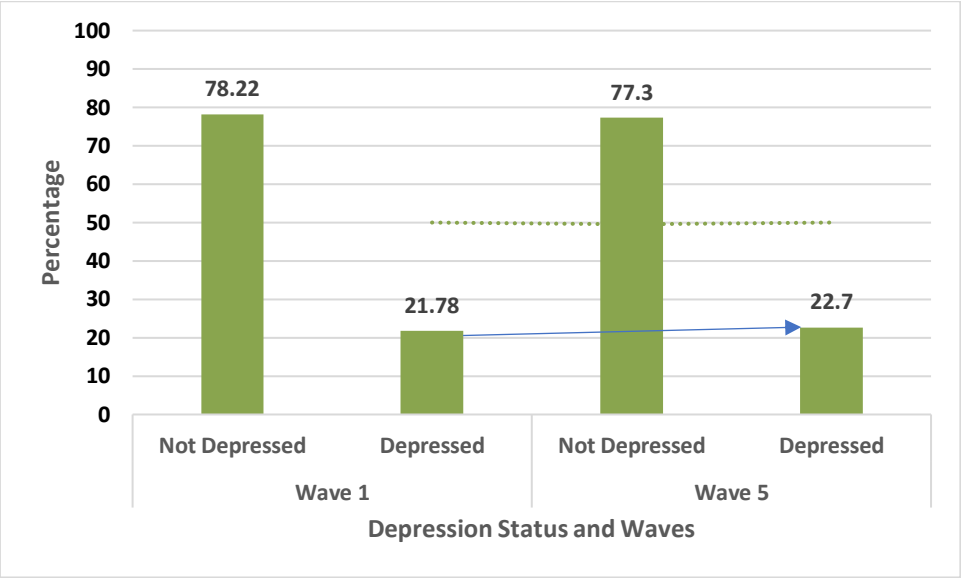

Figure 4.1: Depression levels and changes among young mothers (15-34) in South Africa between Wave 1 (2008) and Wave 5 (2017).

The line graph above shows the changes in depression, where the levels of depression among young mothers was 21.78% at Wave 1. At Wave 5 the graph shows an increase in depression among young mothers to 22.70% prevalence rate.

4.4 Cross tabulation of the outcome variable and all covariates

Table 4.2: Cross tabulation of the outcome (depression) and all covariates showing percentage distributions, p-values and chi2 of young mothers in South Africa, Wave 1 and Wave 5

Characteristics Independent Variables at Wave 4	**Total Number and Percentage**	**Depressed**	**Not Depressed**	**Total %**
Demographic Characteristics				
Age (in years)				
15-34	N %	212 22.70	722 77.30	 100
Pearson Chi2 (20) =33.0933 **P-value=0.033**				
Race				
Other Races	**N** **%**	24 11.43	186 88.57	 100
African	**N** **%**	188 25.97	536 74.03	 100
Pearson Chi2 (2)=19.6091 **P-value=0.000**				

Place of Residence				
Urban	N %	96 22.86	324 77.14	 100
Rural	N %	116 22.57	398 77.43	 100
Pearson Chi2 (1)=0.0110 **P-value=0.916**				
Number of Children				
1 Child	N %	38 21.59	138 78.41	 100
2+ Children	N %	174 22.96	584 77.04	 100
Pearson Chi2 (1)=0.1515 **P-value=0.697**				
Socio-economic Characteristics				
Marital Status				
Married	N %	86 18.22	386 81.78	 100
Not Married	N %	126 27.27	336 72.73	 100
Pearson Chi2 (1)=10.9040 **P-value=0.001**				
Child Grant	N %			
Receiving Grant	N %	202 22.95	678 77.47	 100
Not Receiving Grant	N %	10 18.52	44 81.48	 100
Pearson Chi2 (1)=0.5706 **P-value=0.450**				
Employment status				
Employed	N %	105 20.59	405 79.41	 100
Unemployed	N %	129 20.61	497 79.39	 100
Pearson Chi2(1)=0.0001 **P-value=0.001**				
Education Level				
Primary	N %	16 20.51	62 79.49	 100
Secondary	N %	196 22.90	660 77.10	 100
Pearson Chi2(1)=0.2316 **P-value=0.630**				
Household Income				

R1000-R2000	N %	56 28.28	142 71.72	100
R2015-R3000	N %	46 23.96	146 76.04	100
R3040-R4000	N %	32 20.25	126 79.75	100
R4095-R5000	N %	32 30.77	72 69.23	100
R5056+	N %	46 16.31	236 83.6	
Pearson Chi2 (4)=14.6473 **P-value=0.005**				

When one looks at table 4.2 age is statistically significant at <0.05 [P-value: 0.033]. *The place of residence is not statistically significant with a p-value >0.05 [P-value:0.91].* Race is statistically significant with a p-value <0.05 [P-value: 0.000]. The marital status of young mothers is statistically significant with a p-value <0.05 [P-value: 0.001]. Grant status is not statistically significant and has a statistical significance level >0.05 [P-value:0.450]. Employment status is statistically significant with a p-value <0.05 [P-value: 0.001]. The level of education the mother is not statistically significance with a p-value >0.05 [P-value: 0.630]. Household income is statistically significant with a p-value <0.05 [P-value: 0.005].

4.5 Random and Fixed Effects Models

The table below shows the random the random and fixed effects regression models' results.

Table 4.3 Random and Fixed Effects Logistic Regression Models

Model 1: Random Effects				**Model 2: Fixed Effects**			
Demo-graphic Characte-ristics	**OR**	**P-value**	**95% CI**	**Demo-graphic Characte-ristics**	**OR**	**P-Value**	**95% CI**
Age				**Age**			
Age in year (15-34)	1.06	0.005*	1.0159–1.0951		1.05	0.005*	1.0158 – 1.0949

Race				**Race**			
Other **(RC)**				Other **(RC)**			
African	2.53	0.000*	1.5418 – 4.1594	African	2.53	0.000*	1.5396 – 4.1494
Place of Residence							
Rural **(RC)**				Rural **(RC)**			
Urban	1.33	0.091	0.9553 – 1.8572	Urban	1.331046	0.091	0.9550 – 1.8552
Marital Status				**Marital Status**			
Married **(RC)**				Married **(RC)**			
Unmarried	1.64	0.005*	1.1603 – 2.3058	Unmarried	1.63	0.005*	1.1594 – 2.3019
Socio-economic Characteristics				**Socio-economic Characteristics**			
Educational Status				**Educational Status**			
Primary **(RC)**				Primary **(RC)**			
High School	1.18	0.582	0.6491– 2.1584	High School	1.18	0.583	0.6494 – 2.1561
Grant Status				**Grant Status**			
Not Receiving Grant **(RC)**				Not Receiving Grant **(RC)**			
Receiving Grant	1.49	0.297	0.7059 – 3.1269	Receiving Grant	1.49	0.298	0.7059 – 3.1214
Employment Status				**Employment Status**			
Unemployed **(RC)**				Unemployed **(RC)**			

Employed	0.55	0.007*	0.3612 –0 .8506	Employed	0.56	0.007*	0.3619 – 0.8513
Household Income				**Household Income**			
R5056+ **(RC)**				R5056+ **(RC)**			
R1000-R2000	1.40	0.172	0.8643 – 2.2636	R1000-R2000	1.40	0.172	0.8642 – 2.2606
R2015-3000	1.23	0.402	0.7552 – 2.0154	R2015-3000	1.23	0.402	0.7553 – 2.0133
R3040-R4000	1.01	0.982	0.5937 – 1.7045	R3040-R4000	1.01	0.982	0.5940 – 1.7036
R4095-R5000	1.95	0.017*	1.1256 – 3.3645	R4095-R5000	1.94	0.017*	1.1245 – 3.3566
Number of Children Living with Mother				**Number of Children Living with Mother**			
2+ Children **(RC)**				2+ Children **(RC)**			
	1.21	0.382	0.7920 – 1.8369		1.205663	0.383	0.7921 – 1.8352
Wald chi2: 47.61 **chi2 = 0.0000**			**Prob >**	**Wald chi2: 54.39** **chi2 = 0.0000**			**Prob >**

When one looks at the above models they seem to be the same with slight differences in the confidence intervals. Both models, model 1 and model 2, are statistically significant with the chi2 at almost 50% for model 1 (random effects) showing that the model is fit for the study. Model 2 (the fixed effects) model shows a chi2 of 54.39, also showing a model fit. However, as stated in the methodology section, the decision for the appropriate model is not predicated on the chi2, but by performing a Hausman test to determine the appropriate test.

4.6 Hausman Test Results

The following table shows the output of the Hausman test and the results of the test underneath the results of the table, which will be briefly explained.

Table 4.4: Hausman Test Results

	– Coefficients –			
	(b)	**(B)**	**(b-B)**	**sqrt(diag(V_b-V_B))**
	random	fixed	Difference	S.E.
Age	0.05	0.05	0.00	0 .00
2.residenc~s	0.29	0 .29	0.00	0.01
2.Racewaves	0.93	0.93	0.00	0.01
2.Eduwaves	0.17	0.17	0.00	0.02
2.marstwaves	0 .49	0 .49	0.00	0 .01
Income				
2.R1000-R2000	0.34	0.34	0.00	0 .01
3. R2015-R3000	0.22	0.21	0.00	0 .01
4.R3040-R40	0.01	0.01	-0.00	0.01
5.R4095-R5000	0 .67	0.66	0.00	0.01
2.grantsta~s	0.40	0 .40	0.00	0.02
2.employst~s	-0.59	-0.59	-0.00	0.01
2.noochild~s	0.19	0.19	0.00	0 .02

b consistent under Ho and Ha; obtained from xtlogit

B = inconsistent under Ha, efficient under Ho; obtained from xtlogit

Test: Ho: difference in coefficients not systematic

chi2(12) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.10

Prob>chi2 = 1.0000

The above test shows the results of both random and fixed effects models. The rule of thumb in choosing the test is that if the p-value of the HT is <0.05 we reject the H0 (fixed effects methods is appropriate) in favour of H1 (random effects is appropriate). However, if the p-values is >0.05 random effects method is the appropriate model to use (Amini et.al, 2012). So, random effects model is the appropriate test to use.

4.7 Random Effects Logistic Regression

Table 4.5 Random Effects logistic regression model with relevant parameters essential for predictive equation of depression at Wave 5 among young mothers in South Africa, 2017

Depression among young Mothers	OR	P-value	95% CI
Demographic Characteristics			
Age			
Age in year (15-34)	1.06	0.005*	1.0159– 1.0951
Race			
Other	**RC**		
African	2.53	0.000*	1.5418 – 4.1594
Place of Residence			
Rural	**RC**		
Urban	1.33	0.091	0.9553 – 1.8572
Marital Status			
Married	**RC**		
Unmarried	1.64	0.005*	1.1603 – 2.3058
Socio-economic Characteristics			
Primary	**RC**		
High School	1.18	0.582	0.6491– 2.1584
Grant Status			
Not Receiving Grant	**RC**		
Receiving Grant	1.49	0.297	0.7059 – 3.1269
Employment Status			
Unemployed	**RC**		
Employed	0.55	0.007*	0.3612 –0 .8506
Household Income			

R5056+	**RC**		
R1000-R2000	1.40	0.172	0.8643 – 2.2636
R2015-3000	1.23	0.402	0.7552 – 2.0154
R3040-R4000	1.01	0.982	0.5937 –1.7045
R4095-R5000	1.95	0.017*	1.1256 – 3.3645
Number of Children Living with Mother			
2+ Children	RC		
	1.21	0.382	0.7920 – 1.8369

* <0.05 (p-value: statistically significant)
RC: Reference Category

Even though, there were covariates that were found not to be statistically significant such as place of residence and grant status, and because literature shows these to have an impact on depression, they were added to the final analysis.

After controlling for other covariates, we observe in the random effects model that a one unit increase in age over time is significantly associated with increased odds of depression [OR 1,06, P-value: 0,005]. The effects of being in urban residence, after controlling for other covariates, increases the odds of depression by a factor of 1,33, however it is not statistically associated with increased depression among observed young mothers with one child or more in South Africa [OR 1,33, P-value: 0,091]. Being African, we observed that compared to 'Other Races', was statistically associated with increased depression among observed young mothers [OR 2,53, P-value: 0,000]. The effects of high school education compared to primary education, after controlling for other covariates, increase the odds of depression by a factor of 1,18, however it is not is not significantly associated with depression [OR 1,18, P-value: 0,582]. It also observed that after controlling for other covariates, that being unmarried compared to the married (or living with partner), is significantly associated with higher increase in the log of depression [OR 2,53, P-value: 0,000]. After controlling for other covariates, we observed that compared to those belonging with income more than R5000, earning between R1000-R2000, R2015-R3000, R3040-R4000, increases the odds of depression, however we observed that these categories are not significantly associated with depression [OR 1,39, 1.23, 1,01, P-value: 0,172, 0,402, 0,982]. Only one household income group was significantly associated with depression, earning between, R4095-R5000 was

significantly associated with increased depression [OR 1,95, P-value: 0,017]. Receiving child grant compared to those who do not receive child grant, after controlling for other covariates, is observed to increase depression, however it is not significantly associated [OR 1,49, P-value: 0,297]. After controlling for other covariates, the effect being employed compared to being unemployed is significantly associated with decreased depression [OR 0,55, P-value: 0,007]. Having more than one child compared to having one child is observed to have increased effect in depression, however it is not statistically significant [OR 1,21, P-value: 0,382].

4.8 Complete Multivariate Decomposition

The following table gives a complete multivariate decomposition, with the focus of our results and interpretation in the endowments or characteristics effects.

Table 4.6 Relative contribution of changes in demographic and socio-economic characteristics to depression among young mother with one child or more in South Africa, Wave 1 and Wave 5.

Low Outcome Group: Number of Children Living with Mother==0 [1Child] High Outcome Group: Number of Children Living with Mother==1[more than 1Child]				
Due to Differences in Characteristics (E)				
Demographic Characteristics	**Reference Category (RC)**	**Characteristics effects (Endowments)**	**Coefficients**	**P-Value**
Age		116.47	1007.1	0.04*
Race				
Other Races	**RC**			
African		– 109.13	–215.12	0.00*
Place of Residence				
Rural	**RC**			
Urban		– 2.78	–161.02	0.144
Socio-economic Characteristics				
Education				
Primary	**RC**			

High School		2.40	333.16	0.483
Marital Status				
Married	**RC**			
Unmarried		– 118.34	97.48	0.025*
Grant Status				
Not Receiving Grant	**RC**			
Receiving Grant		10.09	–254.93	0.706
Employment Status				
Unemployed	**RC**			
Employed		39.11	–136.46	0.020*
Household Income				
R5056+	**RC**			
R1000-R2000		– 41.42	–7.89	0.314
R2010-R3000		37.77	135.55	0.171
R3050-R4000		5.27	130.51	0.555
R4100-R5000		– 9.24	– 51.06	0.168
Total		– 70.38	170.38	

* <0.05 (p-value: statistically significant)
RC: Reference Category

The third aim of the study of the study is to describe the contribution of demographic and socio-economic characteristic to depression among young mothers (15-34 years cohort) with one child or more in South Africa. This objective is addressed by the first component in the decomposition output, which is contribution in endowments – explained component – or what is also called characteristics effects. Consequently, only this part of the results is emphasized for description.

The above results in Table 4.6 showed the total and the individual contribution of selected demographic and socio-economic characteristics to depression among young mothers (15-34 years cohort) in South Africa.

The decomposition analysis above showed from wave 1 to 5 that changes in demographic and socio-economic characteristics demographic contributes to 70,38% of the total observed increase in depression among young mother with one child or more in South Africa.

Among the selected covariates there were those variables that were noticeable: age, race, marital and employment status that gave an individual contribution. The decomposition results showed that a unit increase in change in age among young mothers contributes in the log odds of depression in young mothers with one or more child by 16,5% [p-value: 0,04]. The results also showed that being African compared to other races contributes 9,13% to increased depression among young mothers in South Africa [p-value: 0,00]. The results showed that a marital status (unmarried) contributes to 18,89% increase in the log odds of depression mothers with one child or more in South Africa [p-value: 0,025]. The table above also showed that being employed compared to unemployment contributes to 39,11% decrease in the log odds of depression among young mothers with one child or more in South Africa [p-value: 0,020].

Other interesting results from the decomposition, though not statistically significant, are as follows: a change in residential area to urban among young mothers with one child or more, compared to those urban areas, contributes to 3% observed increased in the log odds of being depressed. Receiving child grant compared to not receiving child support grant contributes about 10,09% decrease in the log odds of depression among young mothers with one child or more in South Africa [p-value: 0.647]. High school education compared to primary education level contributes to about 2,4% decrease in the log odds of depression among young mothers with one child or more in South Africa [p-value: 0,447]. The results showed household income between R1000 –R2000 in household of young mothers with one child or more, as compared to those earning more than R5000, contributes to 41,42% in the observed increase in depression among young mothers with child or more. The table of results above shows that household income between R2015 –R3000 in household of young mothers with one child or more, as compared to those earning more than R5000, contributes to 37,77% in the observed decrease in depression among young mothers with child or more. The results also show that household income between R3040–R4000 in household of young mothers with one child or more, as compared to those earning more than R5000, contributes to 5,27% in the observed decrease in depression among young mothers with child or more. The table of results above shows that household income between R4095 –R5000 in household of young mothers with

one child or more, as compared to those earning more than R5000, contributes to 9,24% in the observed increase in depression among young mothers with child or more

4.9 Testing of Hypothesis

The hypothesis for this study was:

H_0: There are no individual effects and contribution of demographic and socio-economic characteristics such as age, race, marital status and employment status on depression among young mothers (15-34 years) in South Africa.

H_1: There are individual effects and contribution of demographic and socio-economic characteristics such as age, race, marital status and employment status on depression among young mothers (15-34 years) in South Africa.

After the analysis was done, it was concluded that the H_0 will be rejected in favour of H_1, that there are individual causal effects and contribution of demographic and socio-economic characteristics such as age, race, marital status and employment status on depression among young mothers (15-34 years) in South Africa. The next chapter discusses these findings.

CHAPTER 5: DISCUSSION

5.1 Introduction

Longitudinal and decomposition studies have been done in silos and respectively looked at investigating social causation of poverty and depression among South Africans with a median age of 35 years, and another study that focused on a gender specific decomposition analysis of subjective social status and inequalities in depressive symptoms among, 18–34 years, 35–64 years, and 65 + years in South Africa. Though these studies have been done, this study contributes to the field of study of depression in South Africa by using longitudinal and decomposition methods to investigate both the individual causal effects that are associated with depression, and decomposition of demographic and socio-economic characteristics to determine their quantified contribution in depression over time in the life of young mothers (15-34) years with one child or more in South Africa.

The purpose of this chapter consequently is to present the findings of this study. The main objective of the study was to investigate the levels, the individual causal effects and contribution of demographic and socio-economic characteristics on depression among young mothers (15-34 years), with at least one child or more in South Africa.
The main objective was broken down into three sub-objectives. First sub-objective identified levels of depression among young mothers (15-34 years) in South Africa? Second, it examined the individual causal effects of demographic and socio-economic factors on depression among young mothers (15-34 years) in South Africa. Third, it determined the contribution of selected demographic and socio-economic characteristics to depression among young mothers (15-34 years) in South Africa.

5.2 Discussion of the Study Findings

This study showed that depression among young mothers is relatively high in South Africa. The depression prevalence from 21,78% at Wave 1 to 22,77% at Wave 5 by almost 1 percentage point (22,77%), as compared to Wave 1 prevalence at 28.41%,. In a study of South African National Health and Nutrition Examination Survey (SANHANES), a comprehensive health and nutrition study that produced key findings on emergent epidemics of non-

communicable diseases, indicated that the psychological distress among females 15-35 was between 25,8% and 28,9% (Shisana et.al, 2012). In a study by Pengpid et al. (2018), a depression prevalence rate of 13% for 2014/15 was reported in South Africa, while Burns et al. (2017) reported a prevalence as high as 38,9% for 2008 NIDS wave study on household income and its impact on depression.

Age is positively and significantly associated with high effect of depression in the following wave, wave 5, while the decomposition analysis showed that age contributes to decreased characteristic effect. These disparities could be explained by the fact that different studies show different results when it relates to age and depression, and because this study uses two different methods such dichotomy could be expected. For example, at younger ages, one study using a negative binomial regression analyses with a log link to investigate the association between maternal and paternal age, and depression found that teenaged mothers have been found to have a high 51% increased risk of having mental illness diagnosis (Tearne et.al, 2016). Another study looked at the relationship between employment and depression using age as a main predictor variable, and performed linear and logistic regression separately for the 18- to 30-year-olds and the 31- to 55- year-old and found that depression is lower among those at 18-30 and goes higher among those 31+ years (Breslin & Mustard, 2003). Some studies showed that relative to generations of older aged parents, young generation teenage mothers in particular are at risk of depression (Fergusson &Woodward, 1999; Harden et al., 2007). The effects of age are ultimately going to be based on the analysis methods used in different studies and some unexplained effects.

Race, being African, was found to positively and significantly associated with increased depression. The decomposition analysis also found that being African has significant contribution to depression among young mothers with one or more children. South Africa has a history of inequality and the result of this study corroborates that reality, that race is complexly connected to social status, which had direct and indirect effects in the demographic of Africans and makes it difficult to separate race from depressive symptomatology (Mutyambizi et al., 2019). One study, a longitudinal analysis of the National Income Dynamics Study (NIDS), investigated the income inequality and depressive symptoms in South Africa, and found that the African population group were associated with higher CES-D-10 scores (depression scores) (Adjaye-Gbewonyo et.al, 2016).

In regression analysis, marital status, being unmarried, was positively and significantly associated with depression, showing as a risk factor to depression. The decomposition results were also significant and also showed that being unmarried contributes to increase in depression among young mothers. One study showed that unmarried teenage child-bearers revealed high levels of depressive symptomatology in young adulthood (27-29 years) compared to women whose first birth occurred as married adults (Kalil & Kunz, 2002). However, the study also continued to indicate that well-being and psychological health of married teenage mothers in future was as good in comparison to that of married adult mothers, while unwed teenage mothers and unmarried adult mothers had comparable poor health outcomes. The study concluded with a suggestion that marital status may be more relevant for future life well-being and psychological health (Kalil & Kuntz, 2002).

There is an interesting results that the study found in relation to grant status of mothers. The regression analysis revealed that receiving grant was positively and high associated with the probability of depression, however this association was not statistically significant. The decomposition analysis on the other hand, showed that receiving child grant contributes to decreased depression. The result on regression analysis may be contrary to studies on grant in South Africa, which showed that social grants play a vital role in addressing health outcomes associated with poverty and the magnitude of these results is dependent on the coverage of grants among the poor in the society (Patel, 2012). The decomposition results of this study corroborate the latter study. However, it is argued that studies that show the importance of social grants in South Africa emphasise on the welfare of the children that receive child grants, not necessarily the health of the mothers (Coetzee, 2013). The study by Coetzee established that cash transfers through the Child Social Grant had an optimistic and encouraging effect on ameliorating nutrition, health, and education of children,. The study by Department of Social Department (DSD) found that recipients of the child support grant had less general illness compared to other children who were not on the grant (Patel, 2012).

The random effects model showed that being employed, is negatively and statistically associated with decreased depression and is shown to be a protective factor compared to those who are not employed. The decomposition analysis confirmed and showed that being employed contributes significantly to decreased depression.

A longitudinal study was done in Ireland that looked at the effect of local unemployment on health among Irish mothers in the period 2001-2011. The results from fixed effect models

demonstrated that a one unit increase in local area unemployment increased the odds of self-reporting poor mental health by 1.4 and 2.7 percentage points. It was states interestingly stated in the study that these results were consistent with the US literature, which is focuses on working men, which demonstrate the universal impact of economic vulnerability on health.

One longitudinal study in Canada found increased likelihood of depression among those who were not working rather than the working groups. It also found that there was no association between unemployment and mental health among those 18 to 30 years. However, the association between unemployment and mental health, according to this Canadian study, was found among those 31-55 years who were unemployed. The study established that unemployment among these age groups led to the increase in distress and to some degree, clinical depression at the sequel or follow-up (Breslin & Mustard, 2003).

One may argue that economic conditions of Canada are not the same as the South African that has more pronounced inequalities as a developing country (Mutyambizi et al., 2019; Costa & Garcia, 2003). As a result, younger people aged 18 and upwards to the youthful age in South Africa, who are mothers and do not have an opportunity to get a job that will provide a salary that will empower them to take care of their loved ones, will be prone to depression.

The results in the study agrees with the hypothesis for the study that there are individual effects and causal contribution of demographic and socio-economic characteristics such as age, race, marital status and employment status on depression among young mothers (15-34 years) in South Africa.

CHAPTER 6: CONCLUSION

6.1 CONCLUSION

The main objective of the study is to investigate the levels, the individual causal effects and contribution of demographic and socio-economic characteristics on depression among young mothers (15-34 years), with at least one child or more in South Africa.

Though young mothers, which are mostly African mothers, receive grant which contributes to taking care of their children, receiving grant is still a risk factor and is positively associated to depression because the receiving of grant help with the wellbeing of children and not necessarily impacts on the wellbeing of mothers. So, the conclusion drawn from this study is that being employed has a decreasing effect and is a protective factor against depression and contributes significantly to the decrease in depression among young mothers in South Africa.

Many women, especially women of African descent, are mostly not employed as South Africa is the most unequal society in the elements or factors of race and gender. If depression has to decrease among mothers and ensure that it does not affect them from raising healthy posterity who are the future of South Africa, it is critical that work or job creation opportunities (whether self-employed or creation of jobs by government and private sector) that will bring self-sustenance be in systematic programmes, not just rhetoric, which will produce sustainable work opportunities for young mothers.

6.2 Strengths and Limitations of the Study

6.2.1 Strengths of the study

The first strength of the study is that it uses the repeated measures design which allowed for a direct assessment of temporality in the relationship of causality between depression and the associated demographic and socio-economic characteristics, which are difficult to deal with in cross-sectional studies.

The second strength of the study is that in order to meet each study objective, a number of methods were used to have an all-inclusive quantitative understanding of the levels, effects and contribution of demographic and socio-economic characteristics at play among young

mothers (15-34) with depression in South Africa. Thus, the descriptive statistics were used to understand the prevalence at base level and changes in depression prevalence over time among the same respondents.

Also, methods such as the panel logistic regression analysis, where both fixed effects and random effects regression method were applied and the Hausman used to decide which test is appropriate for the for panel data or longitudinal analysis to check the individual effects of depression, were used. Also, another robust method such as decomposition analysis was used to look at the quantified contributions of the demographic and socio-economic characteristics to depression among young mothers in South Africa were used.

This contrasts with a nationally representative study, the South African Stress and Health (SASH) study, which studied common mental disorders in the country that included major depressive disorders, and used cross-tabulation methods to estimate prevalence, and logistic regression analysis to study correlates of 12-month and lifetime prevalence (Herman et al., 2009). However, the study also agrees with another study on longitudinal analysis of depression and poverty in South Africa (Lund & Cois, 2018), but differs with this study in that it did not quantify the contribution of demographic and socio-economic characteristics that are at play in depression among young mothers (15-34) in South Africa.

6.2.2 Limitations of the study

Though longitudinal data can help in determining changes over time of the same respondents, the limitation recognised in the study is that not all subjects stay throughout the study, therefore there might be attrition problems, some people may migrate, others die, others might not see the value in the study any longer. The subject available at the end of the study might be different than those at the beginning of the study and this might affect the analysis of the results.

Another limitation is with the Center for Epidemiological Studies and Depression scale-10 (CES-D-10), which was used to create depression variable. It does not measure clinical depression, because the criteria used in CESD is less than two weeks of depressive symptoms. Thus, in determining depression, it does not fit into the criteria for major depressive disorder diagnosis (Radloff,1977). However, if the score is above 10, it is the criteria for probable major

depressive episode (Roberts, 1980) (which according to DSM 5 has some of these components: depressed mood, feelings of worthlessness, and anhedonia or loss of interest) (APA, 2013). One of the limitations of the study is the lack of use of behaviour-related covariates such as drinking habits, smoking and exercise that could help in determining the causal effects of these determinants on depression among young mothers in South Africa.

6.3 Policy Implication

In response to the high and growing rate of youth unemployment in South Africa, the development bank of South Africa (DBSA) introduced a project in September of 2010 to establish a high-level youth employment strategy. Youth unemployment poses a difficult and daunting policy challenge for South Africa. The unemployment rate has been the highest since from the second wave of NIDS data (2008) at 25% in the fourth quarter of 2010, among the highest in the world (Mayer et al., 2011). At the time unemployment was concentrated in the 14–35 age cohort, which accounted for 72% of the unemployed. There has not been much of a change in high unemployment statistics since then, as the unemployment rate was at more than 55% among young people (15-24) years in the first quarter of 2019 in South Africa (Stats SA, 2019).

Against this background, this study contributes to the policy discourse on strategies for implementation for sustainable job creation that will serve as a buffer against depression which leads to suicide, the third leading cause of unnatural death in South Africa, particularly among the youth. The study extends the understanding of youth unemployment within certain sections of the South African society, like mothers aged 15-34 years, so as to quantify the problem and scale the solutions to specific groups not a blanketed approach to employment creation programmes for the youth. This could help policy makers to have a holistic approach to creation of employment where programmes that are designed to help young mothers deal with depression while they ae looking for a job, and helping them specifically with creating a personal development plan that includes finding or creating employment. Such programmes could serve as support groups for mothers to ameliorate the demographic and socio-economic conditions in relation to depression among young mothers in South Africa.

This study showed that part of the decreased effects of depression was employment. Therefore, departments like labour department, can be informed by this study and thus make available more job and vocational opportunities for females in South Africa. The department of education can also glean and benefit from these results as they turn their attention to promoting more programmes that speaks to the importance of education and the opportunities and advantages it would bring to young females who are going to be future mothers.

6.4 Further Research

This study has provided a longitudinal and quantitative analysis in understanding the effects and contribution of demographic and socio-economic characteristics, such as race and employment respectively, to depression among young mothers in South Africa.

However, future research needs to investigate the behaviour-related covariates such as drinking habits, smoking and exercise that could help in determining the causal effects of these determinants on depression among young mothers in South Africa, besides demographic and socio-economic effects. This will help in having a holistic approach to depression and its determinants among young mothers in South Africa.

Reference

Adjaye-Gbewonyo, K., Avendano, M., Subramanian, S. V., & Kawachi, I. (2016). Income inequality and depressive symptoms in South Africa: a longitudinal analysis of the National Income Dynamics Study. Health & place, 42, 37-46.

Allison, P. D. (2005). *Fixed effects regression methods for longitudinal data using SAS*. Sas Institute.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. American Psychiatric Pub.

Amini, S., Delgado, M. S., Henderson, D. J., & Parmeter, C. F. (2012). Fixed vs random: The Hausman test four decades later. *Advances in Econometrics*, *29*, 479.

Bandelow, B., & Michaelis, S. (2015). Epidemiology of anxiety disorders in the 21st century. *Dialogues in clinical neuroscience*, *17*(3), 327.

Barbarin, O. A., Richter, L., & DeWet, T. (2001). Exposure to violence, coping resources, and psychological adjustment of South African children. *American Journal of Orthopsychiatry*, *71*(1),16-25

Bazen, S., Joutard, X., & Magdalou, B. (2017). An Oaxaca decomposition for nonlinear models. *Journal of Economic and Social Measurement*, *42*(2), 101-121.

Benjet, C., Bromet, E., Karam, E. G., Kessler, R. C., McLaughlin, K. A., Ruscio, A. M., ... & Alonso, J. (2016). The epidemiology of traumatic event exposure worldwide: results from the World Mental Health Survey Consortium. *Psychological medicine*, *46*(2), 327-343.

Braam, A. W., & Koenig, H. G. (2019). Religion, spirituality and depression in prospective studies: A systematic review. *Journal of affective disorders*, *257*, 428-438.

Breslin, F. C., & Mustard, C. (2003). Factors influencing the impact of unemployment on mental health among young and older adults in a longitudinal, population-based survey. *Scandinavian journal of work, environment & health*, 5-14.

Brophy, T., Branson, N., Daniels, R. C., Leibbrandt, M., Mlatsheni, C., & Woolard, I. (2018). National income dynamics study panel user manual. *Technical Note Release*.

Burns, J.K., 2008. Implementation of the Mental Health Care Act (2002) at district hospitals in South Africa: Translating principles into practice. *South African Medical Journal*, *98*(1).

Institute of Race Relations.

Burns, J. K. (2011). The mental health gap in South Africa: A human rights issue. *The Equal Rights Review*, *6*(99), 99-113.

Burns, J. K., Tomita, A., & Lund, C. (2017). Income inequality widens the existing income-related disparity in depression risk in post-apartheid South Africa: Evidence from a nationally representative panel study. *Health & place*, *45*, 10-16.

Case, A., & Deaton, A. (2005). Health and wealth among the poor: India and South Africa compared. *American Economic Review*, *95*(2), 229-233.

Carlson, D. L. (2011). Explaining the curvilinear relationship between age at first birth and depression among women. *Social Science & Medicine*, *72*(4), 494-503.

Centers for Desiseases Control and Prevention (CDC), The Social-Ecological Model: A Framework for Prevention (2020). Retrieved from CDC's website: [Online] https://www.cdc.gov/violenceprevention/publichealthissue/social-ecologicalmodel.html

Coetzee, M. (2013). Finding the Benefits: Estimating the Impact of The S outh A frican Child Support Grant. *South African Journal of Economics*, *81*(3), 427-450.

Coiro, M. J. (2001). Depressive symptoms among women receiving welfare. *Women & health*, *32*(1-2), 1-23.

Copeland-Linder, N. (2006). Stress among black women in a South African township: The

protective role of religion. *Journal of Community Psychology*, *34*(5), 577-599.
Datafirst, National Income Dynamic Survey (2018). Retrieved from Datafirst website: *Datafirst.*[Online] https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/central/about [Accessed 10 April 2018].
De Wet, N. (2017). Gendered risk factors associated with self-harm mortality among youth in South Africa, 2006-2014. *South African Medical Journal*, *107*(12), 1132-1136.
Ekanayake, S., Ahmad, F., & McKenzie, K. (2012). Qualitative cross-sectional study of the perceived causes of depression in South Asian origin women in Toronto. *BMJ open*, *2*(1), e000641.
Erskine, H. E., Baxter, A. J., Patton, G., Moffitt, T. E., Patel, V., Whiteford, H. A., & Scott, J. G. (2017). The global coverage of prevalence data for mental disorders in children and adolescents. *Epidemiology and psychiatric sciences*, *26*(4), 395-402.
Fairlie, R. W. (2005). An extension of the Blinder-Oaxaca decomposition technique to logit and probit models. *Journal of economic and social measurement*, *30*(4), 305-316.
Firman, T. (2017). The urbanisation of Java, 2000–2010: towards 'the island of mega-urban regions'. *Asian Population Studies*, *13*(1), 50-66.
Folb, N., Lund, C., Fairall, L. R., Timmerman, V., Levitt, N. S., Steyn, K., & Bachmann, M. O. (2015). Socioeconomic predictors and consequences of depression among primary care attenders with non-communicable diseases in the Western Cape, South Africa: cohort study within a randomised trial. *BMC Public Health*, *15*(1), 1194.
Hadley, C., Tegegn, A., Tessema, F., Asefa, M., & Galea, S. (2008). Parental symptoms of common mental disorders and children's social, motor, and language development in sub-Saharan Africa. *Annals of human biology*, *35*(3), 259-275.
Hare, D. L., Toukhsati, S. R., Johansson, P., & Jaarsma, T. (2014). Depression and cardiovascular disease: a clinical review. *European heart journal*, *35*(21), 1365-1372.
Hedekker, D., & Gibbons, R. D. (2006). *Longitudinal data analysis* (Vol. 451). John Wiley & Sons.
Hendrickx, J. (2000). Special restrictions in multinomial logistic regression. *Stata Technical Bulletin*, *56*, 18-26.
Herman, A. A., Stein, D. J., Seedat, S., Heeringa, S. G., Moomal, H., & Williams, D. R. (2009). The South African Stress and Health (SASH) study: 12-month and lifetime prevalence of common mental disorders. *South African Medical Journal*, *99*(5).
Holborn, L., & Eddy, G. (2011). *First steps to healing the South African family*. South African Institute of Race Relations.
Hsiao, C. (2014). *Analysis of panel data* (No. 54). Cambridge university press.
HSRC, (2017, November 17). Opinion: It's hard to be a good father in SA. http://www.hsrc.ac.za/en/hsrc-in-the-news/general/hard-to-be-good-father-in-sa [Accessed 01 June 2019]
Ingram, R., (2012). Depression, in: Ramachandran, V.S. (Ed.), Encyclopedia of Human Behavior (Second Edition). Academic Press, San Diego, pp. 682–689.
Jackson, P. B., Williams, D. R., Stein, D. J., Herman, A., Williams, S. L., & Redmond, D. L. (2010). Race and psychological distress: The South African stress and health study. *Journal of health and social behavior*, *51*(4), 458-477.
Kail, R. V., & Cavanaugh, J. C. (2010). The study of human development. *Human development: A life-span view*, 7-11.Kalil, A., & Kunz, J. (2002). Teenage childbearing, marital status, and depressive symptoms in later life. *Child Development*, *73*(6), 1748-1760.
Kotchick, B. A., Dorsey, S., & Heller, L. (2005). Predictors of parenting among African American single mothers: Personal and contextual factors. *Journal of Marriage and*

Family, *67*(2), 448-460.
Lara-Cinisomo, S., & Griffin, B. A. (2007). Factors associated with major depression among mothers in Los Angeles. *Women's Health Issues*, *17*(5), 316-324.
Leibbrandt, M., Woolard, I., & de Villiers, L. (2009). Methodology: Report on NIDS wave 1. *Technical paper*, *1*.
Lopez, A. D., Mathers, C. D., Ezzati, M., Jamison, D. T., & Murray, C. J. (2006). Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *The lancet*, *367*(9524), 1747-1757.
Marmot, M., Friel, S., Bell, R., Houweling, T. A., Taylor, S., & Commission on Social Determinants of Health. (2008). Closing the gap in a generation: health equity through action on the social determinants of health. *The lancet*, *372*(9650), 1661-1669.
Manuel, J. I., Martinson, M. L., Bledsoe-Mansori, S. E., & Bellamy, J. L. (2012). The influence of stress and social support on depressive symptoms in mothers with young children. Social science & medicine, 75(11), 2013-2020.
https://doi.org/10.1016/B978-0-12-375000-6.00129-4
McCarter, T. (2008). Depression Overview. *American health & drug benefits*, *1*(3), 44.
Mfenyana, K., Griffin, M., Yogeswaran, P., Modell, B., Modell, M., Chandia, J., & Nazareth, I. (2006). Socio-economic inequalities as a predictor of health in South Africa-the Yenza cross-sectional study. *South African Medical Journal*, *96*(4), 323-330.
Miller, L. J. (2002). Postpartum depression. *Jama*, *287*(6), 762-765.
Muhoza, D. N., Rutayisire, P. C., & Umubyeyi, A. (2016). Measuring the success of family planning initiatives in Rwanda: a multivariate decomposition analysis. *Journal of Population Research*, *33*(4), 361-377.
Mutyambizi, C., Booysen, F., Stornes, P., & Eikemo, T. A. (2019). Subjective social status and inequalities in depressive symptoms: a gender-specific decomposition analysis for South Africa. *International journal for equity in health*, *18*(1), 87.
National Youth Development Agency. (2015). National youth policy 2015–2020.

Nolen-Hoeksema, S. (2001). Gender differences in depression. *Current directions in psychological science*, *10*(5), 173-176.
Norton, E. C., Wang, H., & Ai, C. (2004). Computing interaction effects and standard errors in logit and probit models. *The Stata Journal*, *4*(2), 154-167.
Oh, D. H., Kim, S. A., Lee, H. Y., Seo, J. Y., Choi, B. Y., & Nam, J. H. (2013). Prevalence and correlates of depressive symptoms in korean adults: results of a 2009 korean community health survey. *Journal of Korean medical science*, *28*(1), 128-135.
Patel, L. (2012). Poverty, gender and social protection: Child support grants in Soweto, South Africa. *Journal of Policy Practice*, *11*(1-2), 106-120.
Pengpid, S., & Peltzer, K. (2018). Depression symptoms: their association with socio-demographic factors and health among adults in South Africa. *Journal of Psychology in Africa*, *28*(1), 62-65.
Petterson, S. M., & Friel, L. V. (2001). Psychological distress, hopelessness and welfare. *Women & Health*, *32*(1-2), 79-99.
Pillay, A. L., & Kriel, A. J. (2006). Mental health problems in women attending district-level services in South Africa. *Social Science & Medicine*, *63*(3), 587-592.
Platt, J., Prins, S., Bates, L., & Keyes, K. (2016). Unequal depression for equal work? How the wage gap explains gendered disparities in mood disorders. *Social Science & Medicine*, *149*, 1-8.
Powers, D. A., Yoshioka, H., & Yun, M. S. (2011). mvdcmp: Multivariate decomposition for nonlinear response models. *The Stata Journal*, *11*(4), 556-576.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied psychological measurement*, *1*(3), 385-401.

Richards, C. S., & O'Hara, M. W. (Eds.). (2014). *The Oxford handbook of depression and comorbidity*. Oxford University Press.

Roberts, R. E. (1980). Reliability of the CES-D scale in different ethnic contexts. *Psychiatry research*, *2*(2), 125-134.

Ross, C. E., & Mirowsky, J. (2006). Sex differences in the effect of education on depression: resource multiplication or resource substitution?. *Social science & medicine*, *63*(5), 1400-1413.

SADAG, Depression the Silent Killer (2016). Retrieved from South African Depression and Anxiety Group.
http://www.sadag.org/index.php?option=com_content&view=article&id=1877&Itemid=142

SADHS, 2016. South Africa Demographic and Health Survey (2016). National Department of Health (NDoH), Statistics South Africa (Stats SA), South African Medical Research Council (SAMRC), and ICF, Pretoria: National Department of Health. Retrieved from dhsprogram website: https://dhsprogram.com/pubs/pdf/FR337/FR337.pdf

Seidman, G. (2010). Brazil's' pro-poor'strategies: what South Africa could learn. *Transformation: Critical Perspectives on Southern Africa*, *72*(1), 86-103.

Shisana, O., Labadarios, D., & Rehle, T. (2013). South African National Health and Nutrition Examination Survey (SANHANES-1)[homepage on the Internet]. Cape Town.

Sibanda, A., & Lehloenya, G. (2005). Race and Gender Gaps in Education. *2005) The Demography of South Africa. ME Sharpe Inc*, 253-265.

Singh-Manoux, A., Marmot, M. G., & Adler, N. E. (2005). Does subjective social status predict health and change in health status better than objective status?. *Psychosomatic medicine*, *67*(6), 855-861.

Sinning, M., Hahn, M., & Bauer, T. K. (2008). The Blinder–Oaxaca decomposition for nonlinear regression models. *The Stata Journal*, *8*(4), 480-492.

Stellenberg, E. L., & Abrahams, J. M. (2015). Prevalence of and factors influencing postnatal depression in a rural community in South Africa. *African journal of primary health care & family medicine*, *7*(1), 1-8.

Statistics South Africa, Mid-Year Population Estimates (2011). Pretoria: Statistics South Africa. Retrieved from Statistics South Africa website:
https://www.statssa.gov.za/publications/P0302/P03022011.pdf

Statistics South Africa, Mid-Year Population Estimates (2019). Pretoria: Statistics South Africa. Retrieved from Statistics South Africa website:
http://www.statssa.gov.za/publications/P0302/P03022019.pdf

Statistics South Africa, Mortality and causes of death in South Africa, 2016:
Findings from death notification (2018). Pretoria: Statistics South Africa. Retrieved from Statistics South Africa website:
https://www.statssa.gov.za/publications/P03093/P030932016.pdf

Statistics South Africa, National and Provincial Labour Market (2015). Pretoria: Statistics South Africa. Retrieved from Statistics South Africa website:
https://www.statssa.gov.za/publications/P02114.2/P02114.22015.pdf

Statistics South Africa, Youth Unemployment Still High in Q1 2018 (2018). Retrieved from Statistics South Africa website: http://www.statssa.gov.za/?s=youth+unemployment

Sweetland, Annika C., Gary S. Belkin, and Helena Verdeli. "Measuring depression and anxiety in Sub-Saharan Africa." *Depression and anxiety* 31, no. 3 (2014): 223-232.

Tearne, Jessica E., Monique Robinson, Peter Jacoby, Karina L. Allen, Nadia K. Cunningham, Jianghong Li, and Neil J. McLean. "Older maternal age is associated with depression,

anxiety, and stress symptoms in young adult female offspring." *Journal of abnormal psychology* 125, no. 1 (2016): 1.

Thapa, S. B., Martinez, P., & Clausen, T. (2014). Depression and its correlates in South Africa and Ghana among people aged 50 and above: Findings from the WHO Study on global AGEing and adult health. *Journal of psychiatry*, *17*(6).

Tomlinson, M., Cooper, P. J., Stein, A., Swartz, L., & Molteno, C. (2006). Post-partum depression and infant growth in a South African peri-urban settlement. *Child: care, health and development*, *32*(1), 81-86.

Tomlinson, M., Grimsrud, A. T., Stein, D. J., Williams, D. R., & Myer, L. (2009). The epidemiology of major depression in South Africa: results from the South African stress and health study. *South African Medical Journal*, *99*(5).

Turney, K. (2011). Maternal depression and childhood health inequalities. *Journal of Health and Social Behavior*, *52*(3), 314-332.

WHO Commission on Social Determinants of Health, & World Health Organization. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health: Commission on Social Determinants of Health final report*. World Health Organization.

WHO. Depression, (2017). Other common mental disorders: global health estimates. *Geneva: World Health Organization*, 1-24.

WHO, 2016. *Mental Health: Suicide Data.* [Online] Available at: https://www.who.int/mental_health/prevention/suicide/suicideprevent/en/ [Accessed 1 June 2019].

Zyphur, M. J., Voelkle, M. C., Tay, L., Allison, P. D., Preacher, K. J., Zhang, Z., ... & Diener, E. (2019). From data to causes II: Comparing approaches to panel data analysis. *Organizational Research Methods*, 1094428119847280.