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FUNCTIONAL IMPAIRMENT AND DEPRESSION AMONGST ADULTS LIVING IN SOUTH AFRICA.

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This proposal is submitted in partial fulfilment of the Master of Arts in Demography and Population Studies at the University of the Witwatersrand

DATE: 19 June 2020

I, Paige du Preez declare that the following piece of work is due to my efforts alone and any contributions from other studies or pieces of work have been acknowledged through in-text reference. I acknowledge the full consequences should I be charged with any plagiarism offences.

SIGNED: PAIGE DEMI DU PREEZ

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ABSTRACT:

BACKGROUND: Depression has been increasingly acknowledged as a mental health concern, an expanding burden of disease. South Africa has attempted to alleviate inequalities experienced by the differently abled population, but the effects of inequality are still far-reaching placing both the fully abled and the differently abled both at a surmountable amount of risk for depression. Numerous studies within South Africa have examined the association between different ability and depression, but within the last decade, none have focused on susceptibility of depression as compared between the unimpaired, the physically handicapped and the sensory impaired. Given that South Africa is to undergo an epidemiological transition, it is imperative that its progress in combating this disease be tracked. A vital move if goal number 7 of the SDG's which asserts adequate mental and physical wellbeing for *all* South Africans, is to be achieved. The study aims to compare the likelihood of depression amongst those who are sensory impaired and physically handicapped, and those with no impairment.

METHODS: The study was investigative with a focus on the relationship between type of functional ability and Depression as an outcome in the year 2017. Secondary data was used from the National Income Dynamics Study years 2008, 2012 and 2017. Of the entire population, 4,962,554 were unimpaired, 16,597 were physically handicapped and 50,649 had sensory impairments. All participants of the study had to be present within the years 2008, 2012 and 2017, and all individuals with co-occurring illnesses or who developed such illnesses before 2017 were removed from the study. Percentage distributions were based on selected controls and depression as well as percentage prevalence of depression. Adjusted and unadjusted Mixed-effect regression models were used at the multivariate level.

RESULTS: The prevalence rate of depression was 0.24 in 2017. Individuals who are functionally different had a lower risk of developing depression based on the accumulative effects of social factors [O.R: 0.21]. Furthermore, when adjusted for, the effects of being female (p-value: 0.053), ether white or colored (p-value:0.001 and 0.000) and residing in Urban but informal locations (p-value:0.024) were significant on depression. Having spent R2000-R5000 and having spent over R5000 on household food in the last month (p-value: 0.055 and 0.003),

perceiving household wealth as low or high (p-value: 0.000 and 0.002) and being unrelated to the household head (p-value:0.041) were all risky for depression. In isolation of other contributing factors while their effects were diluted when adjusted for (<0.05% level of significance)

CONCLUSION: In determining the nature of the relationship between functional status and depression, results showed that functional impairment, race and geographical location are solely risky for developing depression. While they mediate the effect of sex on depression. Functionally impaired individuals are less likely to develop depression based on accumulative effects than those with full functioning ability. In short, those who are able, female, reside in urban locations and identify as being of African ethnicity have an increased susceptibility to depression, drawing attention to severe disparities in equality still lingering within South Africa.

Key words: *Functional impairment, Depression, Inequality, Fixed factors, Random factors*

ABBREVIATIONS AND ACRONYMS

AUC: African Union Commission

CES-D-10: Epidemiological Studies Depression Scale

DESA: Department of Economic and Social Affairs

DSPD: Division for Social Policy Development

HHID: Household Identifier

LMIC: Low-Middle Income Countries

NIDS: National Income Dynamics Study

PID: Person identifier

ROI: Return On the Individual

SADAG: South African Depression and Anxiety Group

WHO: World Health Organisation

YLD: Years Lost due to Disability

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CHAPTER 1: INTRODUCTION

1.1) Background

. Being differently abled has been defined from the perspective of the medical model, as a defect lodged within an individual, but recent definitions have also included the social system as an instigator of disabling effects on those with impairment (Siebers, 2008). Impairment can manifest as a result of illness (transmittable/non-transmittable), or it can be acquired in the absence of such illness. Ways in which impairment manifests is through cognitive (remembering or concentrating) or functional deficits (problems with seeing, hearing and communication, mobility loss and loss of self-care) (Statistics, South Africa, 2014; Steiman & Allen, 2012). Having a different ability can also be a by-product of acquired or congenital illnesses such as communicable and non-communicable diseases. Individuals who suffer from impairment often have to resort to more healthcare services than those who are unimpaired, often because they suffer greater morbidity (Fried, Bradley, Williams & Tinetti, 2001). Not only this, but they continue to face discrimination and stigmatization within their society (Degener, 2016). Individuals with such are also more susceptible to smoking, missing healthcare appointments and experiencing greater incidents of abuse, both sexually and emotionally (WHO, 2018).

The WHO (2011) estimated that globally, there were around 1 billion people who have an impairment and that 80% of these individuals reside in LMIC countries. Additionally, 200 million of these individuals have problems with functionality (WHO, 2011). In accordance with the WHO (2017), South Africa has one of the highest percentages of years lost due to disability (YLD) when compared to other low-to-middle income regions such as the Eastern Mediterranean Region, European region, Region of the Americas, South-East Asia region and the Western Pacific Regions (7.9%).

Conditions such as nutritional deficiencies, infectious diseases, violence and injury all impact on the burden of disability, through either a high prevalence or severity and in a context such as South Africa where these conditions remain pertinent issues, it cannot go unnoticed that its context serves as the optimal breeding ground for the development of further disabling states such as negative mental wellbeing. (Adnams, 2010; Nglazi et al., 2016).

There is a significant body of literature which realize the effect of inequality on physical health, and mental health in general, when the subject of physical and mental health is studied within a context such as South Africa however, conditions stemming from inequality cannot be overlooked

(Patel et al., 2018; Messiah, 2011; Yu, 2018). Due to lingering effects of apartheid, race is still deeply rooted as a prime factor of inequality (Charasse-Pouélé, 2006). Predominantly African and Colored populations continue to face the brunt of the effects of disproportionate access to essential services (McLaren, 2013). Such services include that of health care and healthcare accessibility and disproportional access of such services are all resultant of the effects of Apartheid (Coovadia, Jewkes, Barron, Sandes & McIntyre, 2009).

Global studies pertaining to depression amongst both the abled and differently abled populations have noted the central role that social factors play in the negative mental health of populations across cultures and the increasing need to promote mental health through such a lens (WHO, 2018). Sex, Race, age, support, food consumption, perceived household wealth status, and substance use are just some of the factors known to affect mental health outcomes (Braithwait & Mont, 2009). These social factors must also continue to be accounted for in South Africa where the burden of depression is growing and where there is an increasing need to promote mental health through such a lens (WHO, 2018). Research on mental health amongst this population should be ongoing, and not unrestricted to studies mainly related to communicable diseases and non-communicable diseases (Wazakili, Mpofu & Devleiger, 2006; Bernard, Dabis & Rekeneire, 2017).

1.2) Problem Statement:

Depression is an expanding global concern, projected to be the second leading burden of disease by the year 2030 (World Health Organisation [WHO], 2008). Globally, there is growing awareness of the high prevalence of depression both within low- and middle-income countries. This includes continents such as the African region where 10% of its burden of disease is attributed to neuropsychological disorders (Lopez, Mathers, Ezzati, Jamison & Murray, 2006 Depression is characterised by excessive sleepiness or insomnia, excessive hunger or loss of appetite, lack of concentration, slow activity, agitation and suicidal thoughts (Gebi, Markos, Desta & Hailu, 2017). Alarmingly, it has been projected as the second leading burden of disease by 2030 (WHO, 2008) and South Africa continues to experience conditions which not only affect the burden of disability, but also, effects on negative psychological states such as depression persist because of them (Nglazi et al., 2016). The disease has been shown to have a direct effect on mortality as proven by Mackenzie et al. (2011) who found that depression leads to an increased risk for suicidal behaviors. It is also an indirect indicator of the potential for both the personal economic and self-growth of an individual as well as the collective economic and social growth of a country (Thomlinson, Grimsrud, Stein, Williams, & Myer, 2009). These consequences are based on evidence that has revealed a higher risk for social exclusion, slower productivity and a more negative perception of the world as experienced by people who are in depressive states (Lewis & Lockheed, 2009).

South Africa shares an equal percentage of YLD, because of depressive disorders, as that of high- income countries (WHO, 2017). Within South Africa rates of suicide are staggering ranging from 15.4 per 100 000 to as high as 25 per 100 000 of the population contributing to 11% of all non-natural deaths (Schlebusch, 2012). By the year 2020, suicide rates are expected to have increased from 1 million to 1,5 million (Bertolote & Fleischmann, 2009). Not only this but mental health continues to be a stigmatized matter within South Africa and this poses a major threat to individuals who are suffering from depression, deciding not to seek treatment (Henderson, Evans-Lacko & Thornicroft, 2013).

. Due largely to the fact that individuals with impairment are more susceptible to smoking, missing healthcare appointments and experiencing greater incidents of abuse, both sexually and emotionally, the impact of not attending to these risky behaviors can be worse once damage is

done (WHO, 2018). Not only can comorbid mental and physical illnesses result in more health care service needs, but functional impairment, and higher medical costs are bound to come into play (Wolff, Normann & Kaier, 2018).

The stress that comes from unrecognized and/or untreated mental health concerns as a result of stigma or discrimination can exacerbate chronic conditions and evidence has shown that Individuals who have co-occurring chronic physical and mental conditions are also excessively more likely to attempt suicide than those with just the mental condition (Nock et al., 2015; Barnes, Eisenberg & Resnick, 2009). As touched on before and in terms of mental health, data is largely unavailable for populations experiencing functional difference that is not resultant of a coo-occurring illness or found to be comorbid with other transmittable illnesses (WHO, 2008). Questions arise such as; are these individuals more likely to be depressed because of the lingering effects of inequality, or is it as result of the seclusion and limitations experienced as a loss of functionality? In the current context whether at all they are more likely to be depressed within S.A needs answering.

1.3) Research Question:

1.3.1) Main Research Question

What is the likelihood for depression between abled, sensory impaired and physically handicapped South African adults after a 10- year follow-up period? What is the likelihood for depression amongst those who are sensory impaired and physically handicapped compared to fully abled South African adults?

1.3.2*) Sub-questions*

1.3.2.1) what is the socio-demographic and behavioral distribution of South African adults based on the years 2008, 2012 and 2017?

1.3.2.3) what is the percentage distribution of functional status for 2008, 2012 and 2017, as well as the percentage prevalence and percentage distribution of depression in 2017 by functional status and socio-demographic factors within the same ye

1.4) Research Objectives

1.4.1) Main Objective:

To investigate the relationship between selected socio-demographic factors, differences in functional ability and depression amongst South African adults after a 10-year follow-up period

1.4.2) Sub-objectives:

1.4.2.1) To obtain the population distribution of South African adults based on their changing and unchanging socio-demographic and behavioral profile.

1.4.2.2) To assess the percentage distribution of functional status for 2008, 2012 and 2017 as well as the percentage prevalence for depression in 2017, and percentage distribution of depression by functional status and selected socio-demographics within the same year.

1.5) Justification

Researchers, political influencers and organizations are becoming more interested in data which provides more extensive insight into South Africa's burden of mental health states given that it has received so little attention (Jack et al., 2014). Act 17 of the mental health act asserts the right to hospitalization, care and treatment for those suffering from varying forms of negative mental states (Mental Health care Act, 2002). Within the last decade however, RSA has continued to experience lack of human resources for the catering of mental health services for the general population, as far as psychiatrists are concerned, the percentage of professionals within South Africa is 30% lower than the number expected in order to comply with the national norm rate of 1 per 100 000 per population (De Kock, 2017). In efforts to address the gap in mental health resources and services, Return On the Individual (ROI), launched by the *Speak Your Mind Campaign*, brought forth the future impact of poor mental health on the lives of *all* people within South Africa, more especially drawing attention to the lack of resources and severe stigmatization still surrounding depression (Gorringe et al, 2018). Currently however, there is no evidence of success in the plan of scaling up mental health care facilities for both general and marginalized populations, however (United Nations [UN], 2019).

It is also concerning that majority of provincial services have stressed the importance of implementing mental health into primary health care facilities but WHO (2007) report that only a small percentage of primary health care workers receive the training needed to assist in this domain of health emphasizing the gap between general populations and equal access to mental health as already being disparate, with marginalized populations of different ability being far worse-off when it comes to receiving mental health care (WHO, 2018). It is important that more studies and programmes surrounding differently abled populations be targeted as The World Health Organization highlight that people with disabilities are less likely to be targeted for programmes which promote health mental health (WHO, 2018). Evidently, women of different ability receive less screening for cervical and breast cancer and that individuals who are differently abled are more than twice as likely to report health care professionals as inadequately skilled in meeting their needs for health care, three times more likely to report being maltreated when being attended to, and four times more likely to report being denied any assistance at all (WHO, 2018). It is important that consensus is reached with regards to why such difficulties are

still being faced when certain legislative laws which protect the rights of those with different ability have been re-implemented over time. An example is article 12 of the Convention on the Rights of Persons with different ability which asserts the right to the highest attainable standard of health for individuals with different ability, and that state parties of all states must recognize that right without discrimination on the basis of having a different ability (Art. 25) (Division For Social Policy Development [DSPD] & Department of Economic and Social Affairs [DESA], 2016).

Currently general surveys inconsistently disaggregate data on different ability in such a way that it limits the distinct analysis of the social, economic and demographic factors relating to it in health services, is limited (Moodley & Graham, 2015). Research aligned to this is therefore needed as the WHO and other researchers recognize the need for intervening using a socialist lens (WHO, 201). Recently, there has also been an uptake in grants being dished out to populations whom do not have equal access to social security, such populations included those with different ability, African populations and populations living in rural communities (South African Human Rights Commission, 2012). Research aligned to understanding how this uptake may have positively affected depression is therefore of importance and within the scope of this study. In an effort to address any existing health and resource constraints, the African Health Strategy (2016-2030) as a framework encompassing Agenda 2063: "The Africa We Want", is meant to align with the Sustainable development Goals of 2030 in efforts to strengthen already existing policies within the scope of Africa, one being optimal wellbeing for *all* (SDG 3). The framework encompasses seven strategic objectives of which number 5 and 6 request the prioritizing health of women, children, others in need of social protection and investigation into research which strengthens health systems, respectively (African Union Commission [AUC], 2016).

Given that the National Department of Health of the Republic of South Africa is in partnership with the AUC, it is in the hopes that this paper will align with such goals through 1) focusing on a group which needs social protection such as those with different ability and 2) provide insight into depression which would help to strengthen the health system of RSA. In fact, pursuing research which focuses on the mental implications of those living with a different ability *now* can also help with monitoring of the progress of other SDG's (all of them claim to apply

populations who have a different ability) (UN, 2019). Lack of enough and appropriate data on these populations will continue to restrict their inclusion into the evaluation of regional and global progress in terms of alleviating negative mental health states will be undermined (Ingstad & Eide, 2011; UN, 2019)

1

1.4) Definition of Terms

1. Negative mental health states: Any psychological state which is not in alignment with the well-being of an individual.
2. Differently abled: Identified in terms of being Unimpaired, physically handicapped or having problems with sensory functioning.
3. Functional impairment: Hindrance in sensory or motor functioning
4. Unimpaired: Populations which experience full functioning in bodily processes and movement, that is, they experience no limitations in these areas
5. Sensory impaired: Populations who experience limitations in speech, hearing or eyesight.
6. Physically handicapped: Populations who experience limitations in their physical/motor body.

1

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1) Literature Review

2.1.1) *Sex and Depression*

Demographic factors refer often to characteristics which differentiate populations from one another; these can be biological or acquired characteristics such as sex, gender, age and ethnicity (Smith et al, 2015). The effect of it on depression was prominently noted by the WHO (2008) and by researchers more than a decade ago. It was found across counties that females are at a 50% higher risk of becoming depressed as opposed to male. Numerous studies have documented the relationship between Sex and depression. More recently, a meta-analysis done by Salk, Hyde & Abramson (2017) in the U.S using over 1,7 million participants, found that sex had to be analyzed in its relationship to depression in the face of other factors such as ethnicity, literacy, income status and executive positions of employment. Interestingly, the gender disparity for depression was found to be greatest for adolescence and narrowed at the onset of early adulthood while remaining stable throughout adulthood.

In just about every region of the world, females have been shown to have a higher prevalence of depression than males, additionally the region of Africa is considered to have one of the higce of both depressed men and women (WHO,2017). This is in comparison with prevalence rates within the Eastern Mediterranean region, European region, Region of the Americas, South-east Asian region and the Western pacific regions with prevalence's of 6% for women and 5% for men. More specifically within South Africa, Nduna et al., (2013) discovered that depression prevalence was also highest among women within SA with a prevalence difference of 7% compared to men (20.5% and 13.5% respectively)

Studies that were centered around Sub-Saharan Africa report that there is in fact no difference in the susceptibility to depression within some of the counties of this region. One such study by Thapa (2014) for example, found that the effect of sex on depression did not differ within South Africa but sex-depression differences were found within Ghana. Another study by Mchenry et al., (2014) found that within South Africa, women were in fact twice as likely to develop depression than men, their explanation lied in their coming to understand that women are more susceptible to inflammation of cytokines which are found within the brain and aid the regulation in neurotransmitters. The type of data used to explain differences in depression based on sex may

explain this, thus leading to criticism regarding interpretation. According to "SADAG" (n.d), results may be reflecting that women are seeking treatment for depression more than men are, and that they are not necessarily suffering more from depression or are at an increased risk for it. In terms of being differently abled, global studies have shown a similar trend in the gender disparity regarding depression outcomes amongst differently abled individuals with different forms of impairment which included physical disability, with women having the greater odds of being depressed (Noh et al., 2016). Other studies have indicated otherwise, suggesting no clear effect of gender (Wild, et al, 2012).

2.1.2) *Age and depression*

Like sex, the effect of age on depression is not clear cut. Mirowsky & Ross (1992) pursued a study of adults sampled from the United States and Illinois. Results based on trend analyses indicated that due to life-cycle gains and losses such as marriage, employment and economic welfare, the levels of depression dipped in early adulthood and were at its lowest around the age of 45 years. Levels then rose after the age of 80 years, attributed to physical dysfunctions, loss of control and therefore loss of person and status. More recently, the prevalence of depression was found to be highest amongst the 40-49-old year age group and their likelihood to experience lifetime depression was 1,79 times greater than that of other age groups. Using Kaplan-Meier estimates, it was discovered that the lifetime risk for depression increased at adolescence and increased steadily through age groups (Thomilson, Grimsrud, Stein, Williams & Myer, 2009). This study is an example that draws attention to the subtle differences which the results themselves might imply; as with all sub -categorized populations, finding that prevalence of depression is higher amongst a certain age group does not necessarily imply that they are more at risk for depression. Understanding this is realizing that research which analyses both measures in relation to a specific health outcome such as depression is more effective as opposed to analyzing either/or.

The World Health Organization (2018) recognize that people who are developmentally impaired, which can manifest in forms such as being physically handicapped or having a form of sensory impairment, may experience earlier onset of the ageing process beginning around the ages of 40 to 50 and that this is a factor to consider in understanding how depression affects them.

2.1.3) Race, employment and depression

The link between race and depression is also well established. International studies such as that from the USA have reported African American individuals to be more likely to be depressed than white populations, specifically amongst women (Hough Brumitt & Templin, 1999). Majority of South African's population is African. In a study by Ramkisson, Pillay & Sartorius (2016), Indian and White populations were more likely to report being in a better psychological state than individuals of African ethnicity, however. "SADAG" (n.d.) reported that as many as 18% of African individuals go undiagnosed for psychological ailments. Additionally, and compared to Indian and White populations, the highest number of unemployed individuals within South Africa are of African ethnicity (Statistics South Africa, 2015). Socio-economic markers have been pinpointed in its involvement with the outcome of depression. These identifiers are often obtained through questions, reflective of the economic status of populations, such as questions pertaining to workings status (full-time/ part-time/ student, etc.) or household income status (Scaife, Gill, Heywood & Neal, 2000; Hong & Mishra, 2006). Measurement of food consumption within the household is effective in reflecting income status too (Davis, 1982). Gorringe et al. (2018) attribute depression in 80% of the working population however, leading to question whether receiving an income is the factor that affects depression within South Africa or whether it is based on the conditions of the workplace and organizations within the country.

In terms of Employment, people who have a different ability are more likely to be employed but also more likely not to be employed. This is because they are a population more prone to be economically inactive. According to the Commission for Employment Equity (CEE) Annual Report (2013-2014), only 0.9% of the country's Economically Active People are persons with disabilities, that is 50, 867 out of 5, 593, 326 employees have a different ability. The physical restrictions that differently abled individuals experience is enough to inhibit them from being able to thrive in the workplace and this is ignoring the effects of disharmonious attitudes within the workplace (Moodley & Graham, 2015).

Race and gender and different ability must also be assessed in conjunction with employment as the African population has the highest percentage of unemployed individuals (Statistics South Africa, 2015). Inequality based on race and gender is so severe that a white woman with a different ability has equal probability of finding work as that of an African man without a different ability. In short, the African woman with a different ability is far more likely to have

trouble finding employment than any other impaired or unimpaired man or women of another race (Braithwait & Mont, 2009).

2.1.4) Substance-use

*Behavioral factors have been incessantly ascribed in the development of negative mental health states. Physical activity, substance use, indicators of health check-ups and doctor visits as well as patterns of eating are just a few of the many behavioral measurements found in both global- and local studies on mental and physical health (*Bouchard, Blair & Haskell, 2012; Fasoulas , Pavlidou, Petridis, Mantzorou, Seroglou and Giaginis; 2019; Park et al., 2012*).*

Effects of substance use on mental health is extensively evident. Literature has shown that smoking leads to an increased risk for depression, alcohol usage on the other hand, has been deemed as a low risk factor for the disease (Park, et al, 2012).

Substance use is high within South Africa with alcohol usage being the most prevalent. One study by van Heerden, et al. (2009) found that when demographic and socio-economic factors were both adjusted and unadjusted for, African individuals were less likely to engage in all forms of substance use. According to the results from the study, alcohol usage (38.7%) was mostly consumed among the study population, followed by tobacco (30.0%) (van Heerden et al., 2009). The prevalence was decreased when compared to prior studies of less representativeness. African participants were less likely to engage in smoking compared to Indian/Asians and had a way lower likelihood of engaging in alcohol use, tobacco and other drugs such as methamphetamines when compared to White and Colored populations.

2.1.5) Food Household expenditure and depression

Literature pertaining to food security and its effects on mental health have consistently noted the link between food insecurity and poverty (Ives & Cullen, 2011). Household food expenditure is integral to every household and out of all categories of expenditure, has the highest implications for wellbeing (Maynard, Andrade, Packull-McCormick, Perlman, Cesar Leos-Toro & Kirkpatrick, 2018). Studies have found that the effect of food insecurity on nutritional status, poor general health and a spectrum of chronic health conditions. Independently, it has been is associated with poor mental health (Jessiman-Perreault & McIntyre, 2017). It plays a central role in alleviating poverty which is a primary objective for most countries (Anker, 2011). A possible association between gender and food insecurity has been documented. Literature makes note of the burden of food insecurity` increasing not only in low- income counties but how this is

increasing within high-income countries thus presenting itself as an ever-growing global concern. In one such study by Maynard, Andrade, & Packull-McCormick et al., (2018) a link between poor mental health and food security was found amongst women in the U.S, illustrating the increasing burden of food insecurity within high-income countries (Tarasuk, Mitchell & Dachner, 2014). Within Sub-saharan Africa, the prevalence of undernourishment appears to have risen from 20.8 to 22.7 percent between 2015 and 2016 (Food and Agriculture Organization [FOA], 2017). Interestingly, a study testing the effect of social support and the feeling of belonging to a community revealed that prevalence of food-household insecurity is lower amongst individuals who identified as belonging to the community, as opposed to individuals who did not have a strong sense of community (Martin, et al., 2016). In another study parental support was found to have no effect in reducing the likelihood of food insecurity over a 3 -year period (Hansen & Olsen, 2012)

The General Household survey of 2014 made note of the change in household access to food from the years 2002 until 2014. Based on the Household Food Insecurity Access scale, the percentage of *households* who experienced hunger decreased from 29,3% to 13,1% while the percentage of *individuals* who experienced hunger decreased from 23,8% to 11,4%. Data from the survey indicated that since 2011 up until 2014, the percentage of individuals who experienced hunger increased very slightly by +0,3% to 13,4%. In a study assessing Engle curves in order to understand the trajectory of Food expenditure within South Africa, waves 1, 2 and 3 of NIDs were used. According to results from the study, and apparent from waves 2 to 3, more high-expenditure households spent nearly all their household expenditure on food (Mhlongo & Daniels, 2013). Mhlongo & Daniels (2013) attributed this to increased prices of food that impacted South Africa as well as the global population Mhlongo & Daniels (2013). In another study assessing household effects in relation to depression, multivariable analysis demonstrated that larger household sizes ($p<0.05$), receipt of social grants ($p<0.05$), higher food expenditure ($p<0.01$), and drawing up retail shop accounts in response to financial distress ($p<0.05$) were independently predictive of worse (higher) PHQ-9 scores (Docrat, Cleary, Chisholm & Lund, 2019).

2.1.6) Relationship to Household head and depression and depression

Psychosocial factors are identified as the environmental and social factors such as family support and the establishment of structures which aid in coping ability (Szigethy, et al., 2017). Effects of

household structures on the mental health of young adults and adolescents has been well documented (Deater-decard, Pickering, Dunn & Golding, 1998; Yu et al., 2015). Using Social Support Theory as a reference, the effect of this kind of factor can be understood in relation to support. The Social Support Theory is considered from three perspectives; one- support from others buffers effects of stress and leads to better coping, two- an individual's self-esteem and self-regulation are significantly improved and therefore social support directly impacts health and, three- social support affects health because it provides companionship and intimacy (Cohen, Underwood, & Gottlieb, 2000). Strawbridge, Deleger, Roberts & Kaplan (2002) came to the conclude that the risk for depression was proportional to the increase in age of an individual, due mainly to effects from gradual increase of physical inactivity but also from decrease in social support.

International studies acknowledge the need for assessing family structures in relation to mental health outcomes. In a study by Jansen (2017) from the University of Kentucky the effect of extended family members on the mental health of young adults was examined. Jansen's finding revealed an association self-esteem and depression and perceived social support from immediate family members. Additionally, a relationship betwixt perceived support received from immediate family members and perceived support received from extended family members was found. This study indicates the potential that extended family members have for enhancing mental health by adding support to that already provided by immediate family members, essentially promoting mental health. Similarly, results from a study done within the UK, Lippold and Burns (2009) found that people with *physical* impairment differ to those with *intellectual*impairment in terms of having a broader social network and therefore had a decreased likelihood for experiencing depression. Analysis revealed that different variables were risky for avoiding depression within these different household types for women, this is one study which shows a clear demonstration of the complexity in establishing causal pathways for depression. Another study within China found that family structure (Nuclear, extended, alone and couple) was not related to depression, but rather depression was associated with family functioning (Cheng,
Zhang, Wang, Zhang, Ye & Liang, 2017). Family functioning describes the way an individual is incorporated into social life, it is based on the emotional, material and influential support for the family members (Belsey, 2005).one other study revealed higher levels of depressive symptoms among individuals who came from stepfamilies, single parent families, and single

parent families with other relatives present when compared to nuclear families where both parents are present (Barret & Turner, 2005).

The type of family structures within South Africa has shown a slight shift from Extended families to nuclear families (Kimani & Kombo, 2010)) however little to no studies exist regarding household structure and support from the perspective of being a non-relative, nuclear family member or extended family member within a household.

2.1.7) *Functional status and Depression*

Difference in ability manifests in the forms of physical, intellectual and psychosocial impairment. While physical differences are primarily manifest in terms of functioning capacity, intellectual differences manifest within the psyche of the person. Psychosocial differences manifest in response to negative mental health states which ultimately become disabling (ROI, 2018).

Mobility is crucial as it allows for the ability to move through space using one's own body and forms the building blocks for the successful completion of both instrumental daily-life activities such as interacting and bathing and daily-life activities, such as going to work or social participation (Lowry et al., 2012). Given this, any limitation which inhibits this aspect of being able to do and complete everyday tasks is indeed risky and makes it difficult to combat development of depression (DESP & DESA, 2016).

In terms of Ability, a substantial amount of studies indicate that a significant relationship exists between functional status and depression (Rovner, Zisselman, & Shmuely-Dulitzki, 1996). However, a sensitivity test conducted in Asia regarding severity of different ability and its effect on depression resulted in a non-statistically significant relationship existed between the two (Noh, Kwon, Park, Oh & Kim, 2016). There is evidence that suggests the effects of physical limitations are related to depression rather than the form of different ability being related to depression itself (Schreurs, Denise, de Ridder, Bensing, 2002). Logically then, an objective method of measuring sensory capacity or potential is commonly recommended given that depression cannot accurately be assessed in response to an individual simply just ticking yes or no on a survey (Choi, Lee & Lee, 2018).

Global studies have assessed the effects of sensory impairment on depression and found a statistically significant relationship between the two (Rovner, Zisselman, & Shmuely-Dulitzki, 1996; van der Aa, Comijs, Penninx, van Rens, & van Nispen, 2015). Other international studies done within higher income regions of the world such as USA, have found that in the presence of

other confounding factors, the relationship was no longer found to be statistically significant (Zhang, 2013). An example of such a study was done in Asia where a sensitivity test regarding severity of different ability and its effect on depression resulted in a non-statistically significant relationship between the two (Noh, Kwon, Park, Oh & Kim, 2016). An objective method of measuring sensory capacity or potential is highly recommended In a separate study done within China which took a longitudinal approach to understanding functional ability not just as a factor but as a cause for depression, using Cox Proportional Hazards Regression analysis, a significantly higher hazard ratio was found for individuals who were visually impaired compared to equally representative control groups (Choi, lee & lee, 2018).

Within South Africa, recent studies surrounding physical disability and depression have targeted the older population. Within its context, depression and disability has also been looked at in relation to communicable diseases such as HIV or AIDs and degenerative diseases with analysis of physically handicapped or sensory impaired populations being rather scarce. One study done within RSA found that quality of life, different functional ability and chronic illness were all associated with self-reported depression in adults 50 years< (Peltzer & Phaswana-Mafuya, 2013). Another study investigating functional ability found that a positive relationship exists between functional dependency and depression, while cautioning against over-generalization of results to younger age groups (Tomita & Burns, 2013).

2.*1.8) CESD-10 scale*

The CESD--10 Scale has been used globally and cross-culturally as a useful measure for Depression, Additionally, it encompasses a wide array of the depressive symptomology (Zhang, et al., 2012). It is quite CESD-10 scale is quite strong in its validity in measuring the construct of depression as it has a Pearson's r produced a correlation coefficient of .71 (Miller, Anton & Townson, 2008). According to Miller et al. (2008), the CESD--10 is also internally reliable with a cronbachs alpha coefficient of .81. Even though it is a shortened version of the CESD-20 scale, its validity and reliability are equally comparable (Boey, 1999). Recent studies which have applied the scale to the South African population include one by Ajero et al. (2018) which used the CESD--10 scale to measure depression amongst a population of South African adolescents. Another study by Baron, Davies & Lund (2017) who assessed its applicability particularly to Zulu, Xhosa and Afrikaans populations in South Africa, found that it was valid. The cut-off scores have been

identified as ranging from 8 up to 16, however a score of 8 or 10 has been considered the optimal cut-off score for measuring depression.

2.1) **Theoretical and Conceptual Framework**

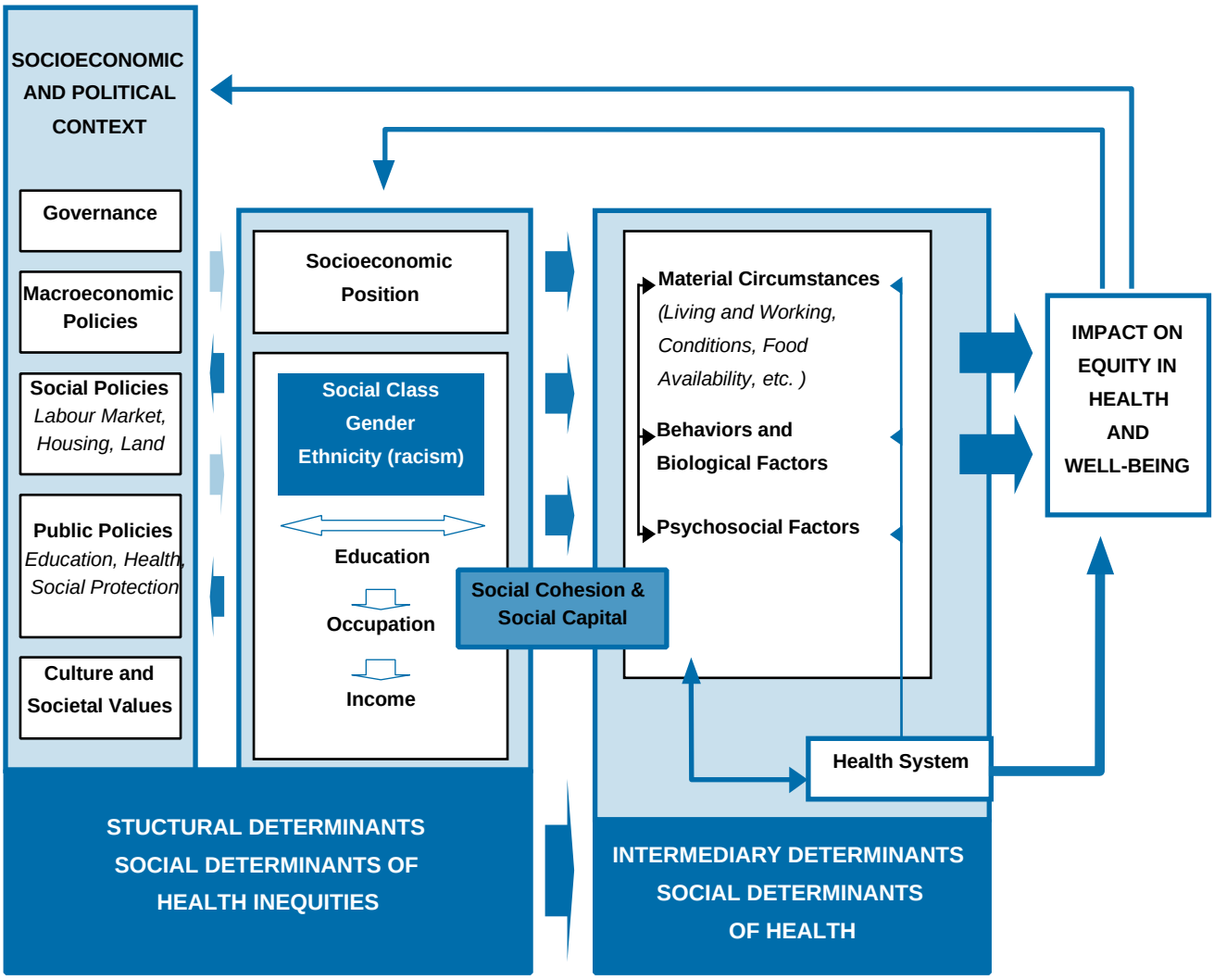


Figure 2.1: Theoretical Framework of the Social determinants of Health

Figure 1 is an illustration of the Social determinants of health framework. This framework depicts the extent to which individual and populations are at risk for poor health outcomes such as that of depression. Generally, the framework is based on interactions between an individual and their social and physical environment (Healthy People, 2020). For example, people with a

quality education, safe homes and neighborhoods, access to preventive services and secure employment tend to be healthier throughout their lives. More specifically, it proposes the 'social gradient' as a basis for understanding health outcomes (Marmot, 2005). The social gradient is a concept symbolizing the idea that there are greater health risks for people of poorer social status than those of higher social status, the impact of this social status can also accumulate over time (Marmot & Bell, 2016). This premise regarding negative effects as a result of social status is particularly applicable to the study as social status, whether apparent or not, still largely governs aspects which contribute to resistance of equality within South Africa (Patel et al., 2018; Messiah, 2011; Yu, 2018). To date, the negative effects of being differently abled have been understood from an economic resource perspective, particularly within high-income areas (Saunders, 2006).

The argument for understanding different ability through a social determinist lens has been strengthened both internationally and Regionally. Researchers studying the disadvantages of different ability in the Solomon Islands of Australia is a paper which offers such an argument. Gartrell, Jennaway, Manderson, Fangalasuu, & Dolaiano (2018) acknowledged the need for understanding how socio-cultural, political and economic contexts shape the effects of different ability within Low income countries. Within South Africa, the approach to addressing inequality for differently abled communities evolved post-apartheid from a medical model to that of a social perspective (WHO, 2017). Numerous studies applying to SA have thus used the model in research focused on factors which influence health such as communicable diseases and gender-based violence (Adjah & Agbemafle, 2016; Schreurs et al., 2002). The social determinants of health framework continue to influence numerous focal points of studies pertaining to depression, not only among abled populations, but also amongst differently abled populations (Emmet, 2006). and has proved time-and-time again to be universally applicable (WHO, 2008)

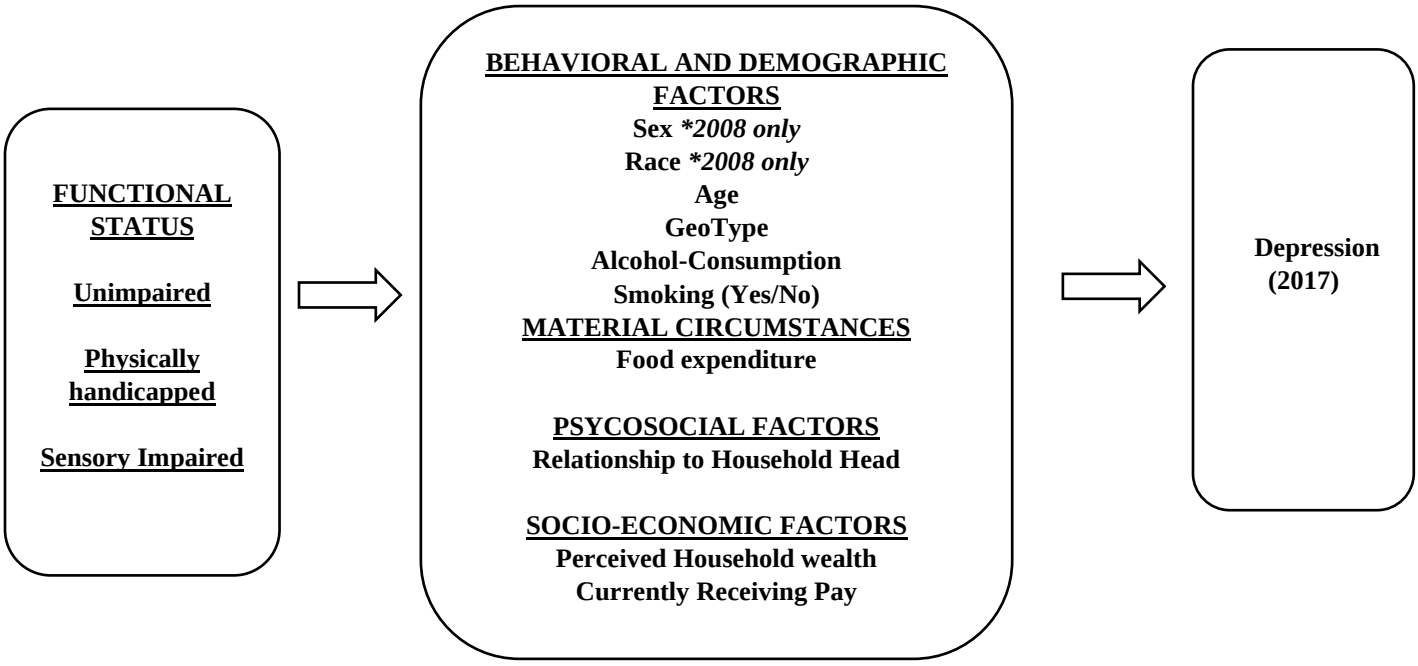


Figure 2.2: Conceptual Framework derived from The Social Determinants of health Framework

The conceptual Framework (Figure 2) applies particularly to this study illustrating the pathway of social factors interacting together in affecting disparities in health. Structural and Social determinants that were included as variables in the study were Socioeconomic position (socioeconomic status); Material Circumstances; Behavioral, Psychosocial and Biological Factors. The conceptual model symbolizes what the study aims to achieve. Essentially it depicts that the cumulative effects of demographic, behavioral, material and psychosocial characteristics of unimpaired, sensory impaired and physically handicapped populations from 2008 to 2017, exacerbate negative mental health states such as depression. Since the study aimed to understand the cumulating effect of these variables from 2008, 2012 and 2017, the mixed effects approach to understanding this required that these factors be either fixed or random, meaning that as time passes some of these factors change depending on the circumstances and life choices of an individual. In the conceptual model, this included everything excluding sex and race considering that these were not susceptible to change.

The study did not make use of any political or socio-economic policies or broader structural determinants because many studies pertaining to depression with SA noted the key involvement

of factors as the household and individual level (socio-economic stance and intermediary determinants)

2.3) **Hypotheses**

The hypotheses for the study are:

H1: Individuals with functional impairment are equally likely to be depressed as those who are unimpaired in the face of other fixed and changing social factors.

H0: Individuals with functional impairments are more likely to be depressed than those without it in the presence of other fixed and changing factors.

CHAPTER 3: METHODOLOGY

3.1) Study Design:

The study was approached using the positivist paradigm of research inquiry with a quantitative approach to gaining insight into the relationship between functional impairment and depression. Even though the study made use of secondary panel data collected in the years 2008, 2012 and 2017, it did not make comparisons over time (not longitudinal). Instead, panel data was pooled so that accumulative effects on depression in 2017 from selected factors from all three years could be obtained, using a source which provided data from three different points in time, deeming the current study as cross-sectional.

3.2) Data Source:

Secondary data was used from the National Income Dynamics Study (NIDS) of 2008-2017. The National Income Dynamics Study is the first national household panel of South Africa and was implemented by the Southern Africa Labor and Development Research Unit (SALDRU) based at the University of Cape Town's School of Economics. The study began in 2008 with the intention of tracking the changing dynamic of poverty across 7300 households within the country (SALDRU, 2014). NIDs offers recent data making it a more reliable source for data usage and is also nationally representative (Moodley & Graham, 2015)

3.3.) Sampling Design

The sample was drawn based on a stratified two-stage clustering design, specifically batch sampling, targeting private households and individuals residing within monasteries, convents and workers hostels (Leibbrandt, Woolard and De Villiers, 2009). Due to the fact that there was substantial conflict regarding sample size, response rates and budget/time limitations as well as uncertainty about the causes and levels of non-response, batch sampling was necessary. It was designed for adaptability to adjust the sampling rate in each stratum, this is because as information about stratum response rates became available as the study progressed. Weights were also incorporated so as to adjust for these effects as well as the effects of attrition (Branson & Wittenberg, 2019).

3.4) Study Population and Sample Size:

Respondents aged 16 and above, both male and female and representative of diverse individual characteristics and socio-economic statuses were included in the study on the basis that they were present for each year in which enumeration took place (2008, 2012 and 2017). Out of the

population (5,029,801), 4,962,554 were unimpaired, 16,597 were physically handicapped and 50,649 were sensory impaired. The study required that no individuals have co-occurring illness present at base line, it was also ensured that no development of a cooccurring illness was experienced by the population in the years 2012 and 2017. Respondents were removed from the study if they had psychological or psychiatric disorder, HIV/AIDS, Epilepsy/ fits, Emphysema and Alzheimer's disease in addition to being unimpaired or impaired. This was important in order to alleviate effects that other forms of illness such as communicable and non-communicable diseases that could affect functional ability as well as depression (Schreurs et al., 2002; Bernard, et al., 2017).

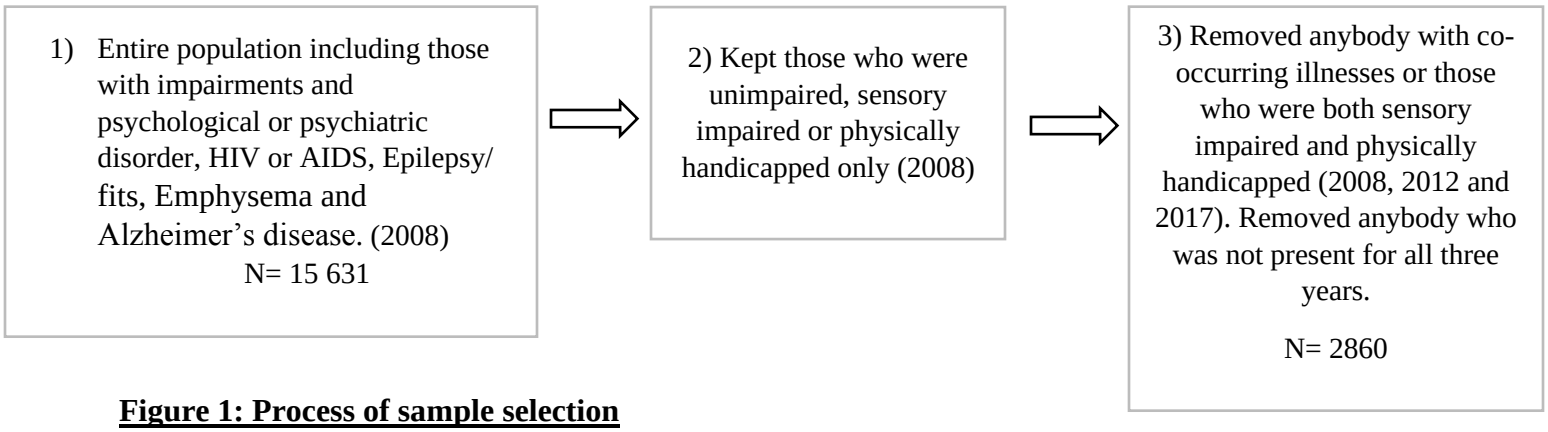


Figure 1: Process of sample selection

3.5) **Questionnaire Design:**

The questionnaire covered a broad range of questions from demographic- to socio-demographic - factors and questions pertaining to health over time. Some questions were open-ended and required respondents to provide their own answers while others were based on likert-scales requiring responses based on several given options. Few questions required binary yes/no answers. The questionnaire contained 17 sections that cover areas pertaining to the following: *Demographics, Children ever born, Birth history, Parent's education, living arrangements and vital status, Individual income from non-employment sources, Health, Emotional health, Household decision-making, Well-being and social cohesion, Measurements, Numeracy module and Alternative contact information*. Specific data sets that were used for this study were from the Adult questionnaire (demographics, and behavioral measures), Household questionnaire

(food consumption measure), and household roster (for ascertaining type of household membership).

3.6) **Study Variables:**

3.6.1*) Dependent Variable*

The dependent variable was Depression which is clinically defined as an experiencing of at least 5 symptoms. These symptoms avail through excessive sleepiness or insomnia, excessive hunger or loss of appetite, lack of concentration, slow activity, agitation and suicidal thoughts (Gebi, Markos, Desta & Hailu, 2017) with one of them being any one of two symptoms; either lack of interest or pleasure, or a depressed mood experienced over a two-week period (Gebi et al., 2017). For the purposes of this study depression was generated as an outcome variable based on the CESD-10 scale. The CESD-10 scale is quite strong in its validity in measuring the construct of depression as it has a Pearson's r produced a correlation coefficient of .71 (Miller, Anton & Townson, 2008). According to Miller et al. (2008), the CESD--10 is also internally reliable with a cronbachs alpha coefficient of .81. The highest CESD-10 score obtained from the study was 31. Scores of 0/10 reflected "Not depressed" and scores of 11 and above reflected "Depressed". The specific cut-off score of 10 was chosen because according to Baron, Davies and Lundt (2017), it has been identified as one of the most effective cut-off points in measuring depression. The CESD-10 did not have to be adapted and faired for this study as its applicability to South African population has already been established (Ajero, et al., 2018). The CESD-10 was perfectly aligned with this study because questions asked in the CESD--10 corresponded exactly with the questions on the Emotional Health section within the National Income Dynamics Study Adult Questionnaire, making it even more convenient. These were in the form of likert scales where 0 = Rarely or None of the Time (Less than 1 Day) 1=Some or a Little of the Time (1–2 Days) 2=Occasionally or a Moderate Amount of Time (3–4 Days) 3=Most or All of the Time (5–7 Days)

Questions from the CESD--10 Scale were as follows;

During the past week:

A1(1) I was bothered by things that usually don't bother me.

E5(2) I had trouble keeping my mind on what I was doing.

F6(3) I felt depressed.

G7(4) I felt that everything I did was an effort.

H8(5) I felt hopeful about the future.

J10(6) I felt fearful.

K11(7) My sleep was restless.

L12(8) I was happy.

N14(9) I felt lonely.

T20(10) I could not get "going."

TABLE 3.1: Categorization of the outcome variable

VARIABLE NAME	VARIABLE	DEFINITION
Emo_ (Emotional Health)	Depressed	Depressed <10 (1) Not Depressed 10> (0)

3.6.2) Independent Variables

. In order to obtain functional status, a variable indicating whether they were sensory impaired or physically handicapped had to be examined. Those who had information missing for this variable were considered unimpaired. The missing data had to then be coded and labelled as 'unimpaired' and with the existing data on sensory impairment and being physically handicapped, the variable could be labelled as functional status. observations indicating unimpairment got a coding of 1 while observations indicating sensory impairment and physically handicapped individuals had their original coding of 2 and 3 respectively (each consistent with its original coding within the data set).

3.6.3) Control Variables

3.6.3.1) *Sex, Race, Geographical location, Smoking and Employment*

sex, race, geographical location, smoking and employment were all coded as given within their respective questionnaires for all three years (Adults questionnaire and household inderrived questionnaire; which contained data pertaining to geographical location). The categories of geographical location were aligned with those stipulated in Census of 2001. Accordingly, Urban formal settlements contain hostels, industrial areas, institutions and recreational facilities. Rural

areas and tribal areas are similarly categorized except for the presence of farms and tribal settlements Urban informal areas are distinguished by the presence of informal settlements (Census, 2001).

3.6.3.2) *Age*

Age was obtained by subtracting the year of birth of everyone from the year of each wave that is 2008, 2012 and 2017. This allowed for the exact age in years for each person for the years 2008, 2012 and 2017. If working with data from wave 1 and an individual was born in the year 1998 then this year would be subtracted from 2008 to get the exact age of the individual in years. Age was used categorically (age groups *15-19, 20-24* etc) at the univariate and bivariate level of analyses and used continuously for multivariable analyses.

3.6.3.3) *Alcohol Consumption*

Alcohol consumption was coded according to three degrees of its usage;

1) *I have never drank Alcohol =NEVER*
2) *I no longer drink Alcohol*

3) *I drink very rarely =RARELY*
4) *Less than once a week*
5) *On 1 or 2 days a week*

6) *On 3 or 4 days a week =WEEKLY*
7) *On 5 to 6 days a week*
8) *Everyday*

3.6.3.4) Household Food Expenditure

Food expenditure was enumerated according to the amount which individuals reported they had spent on food in the last month, this ranged from R0 up to 30000 when accounting for all three years and was coded into three categories separating the most amount of money spent on food from the least amounts. Categories were designated as follows; 1) households who spent R0-R2000 on food in the last month; 2) ones who spent R2000-R5000; and 3) households who spent above R5000 in the last month.

3.6.3.5) Relationship to Household Head

Type of household Union was manually created as a variable by an examination of each of the participants HHID's, a variable which identifies each household that was enumerated at the time, from one and the other. By looking at these HHID's within another questionnaire, the kind of relationship each of its residents had to the head of each holding could be found. Once this was ascertained, coding could commence according to the mode (most frequently occurring) of different family types which emerged (see Table 3.2). Coding was based on the presence of enough observations for each variable as the Statistical Analysis software that was used would allow only for a minimum number of observations before it could execute effective analysis at the multivariate level.

The weighting variable was designed to include all new persons who entered the NIDS from the first wave of data collection and was found within the 2017 Household derived data set (w5_wgt).

TABLE 3.2: Categorization of the Main Independent variable

VARIABLE NAME	VARIABLE	DEFINITION
w1_a_hlser1 (Respondent has any other form of illness or disability?)	Type of Ability	Unimpaired (1) Physically handicapped (2) Sensory impaired (3)

VARIABLE NAME	VARIABLE	DEFINITION
w1_a_gen (What is your gender?)	Sex	Male (1) female (2)
_Dob_a_y (What is your date of birth?)	Age	15-19 (1) 20-24 (2) 25-29 (3) 30-34 (4) 35-39 (5) 40-44 (6) 45-49 (7) 50-54 (8) 55-59 (9) 59< (10)
w1_a_popgrp (What population group do you belong to?)	Race	African (1) Colored (2) Indian/Asian Whites (3)
geo2001 (Sampled Geotype 2001 Census)	Geographical location	Rural (1) Tribal Authority Areas (2) Urban Formal (3) Urban Informal (4)
a_hllfalc (How often do you consume alcohol?)	Alcohol consumption	Never (1) Rarely (2) Often (3)
_hllfsmk	Smoking	Yes (1) No (2)
_hhrel (relationship to household head)	Type of Family Member	Household Head (1) Extended (2) Nuclear (3) Other (4)
_fwbstptd (Income step of household today)	Perceived Household Wealth Status	low (1) Average (2) High (3)

_em1 (Are you currently being paid to work for an employer other than yourself whether full time or part time?)	Employment	Yes (1) No (2)
_fdtot (What was the household's total expenditure on food in the last month?)	Household Food expenditure	2000> (1) 2000-5000 (2) 5000< (3)

TABLE 3.3: Categorization of the Control Variables

3.7) **Ethics:**

Data was used from an open-to-the-public website. No confidentiality agreements had to be made as consent was already obtained before data was collected and no personal information which could potentially lead to participant identification was made publicly available. Additionally, and because no risk was posed to any of the participants in the study, full ethical clearance for the study did not have to be applied for, instead a process had to be undergone which allowed for waivering of the ethical process. Once clearance was obtained, number WDEMG2019/07/09 was assigned to the study so that once submitted, it is already identified as being cleared for any issues of ethicality.

3.8) **Data Management:**

Data analysis was handled through Stata 15 and in two stages. The first stage was to clean the data according to inclusion criteria for the study (see figure 1). All individuals who were below the age of 18 were removed as well as those who had comorbid disorders or illnesses along either being fully abled or having a physical or sensory impairment in 2008. They were also removed if they developed such states or were entirely absent from proceeding years of follow-up (2012 and 2017).

Variables of interest (independent, intervening and controls) were then coded accordingly for each year included, while ensuring that individuals who had missing data for any of the variables were removed. When this was achieved, data from each of the separate years were merged together into one data set so that analysis could be ensued. Variables had to be named according to the wave in which they were in, only if they were susceptible to changing from year to year

(all controls besides sex and race). Food Expenditure for the year of 2008 would have had to be denoted by a 1 next to the variable name e.g. *Foodexpenditure1* while the same variable reflected within the years of 2012 and 2017 had to have the same name followed by the numbers of 2 and 3, respectively (i.e. *Foodexpenditure2* and *Foodexpenditure3*). This had to be done for each variable so that stata could identify it as a random variable. Fixed factors did not change over time and therefore did not need to be notated. (*sex and race)*.

3.9) **Data Analyses:**

3.9.1) *Obtaining the population distribution of South African adults based on their changing and unchanging socio-demographic and behavioral profile.*

This first stage of analysis was to establish percentage levels of the population based on their selected changing and unchanging socio-demographic profile. If we consider sex as a selected factor for instance, through commanding that this variable be tabulated using STATA, the frequency and percentages of adults who are female and male could be obtained and compared for across 2008, 2012 and 2017.

Obtaining percentages of population by selected factors across all three waves allowed for a picture of the changing distribution of South Africa's population based on social identifiers which are key in eliminating depression.

3.9.2) *Assessing the percentage distribution of functional status for 2008, 2012 and 2017, percentage prevalence of depression in 2017, and percentage distribution of depression by functional status and selected socio-demographics within the same year*

The population distribution by functional status could be obtained from tabulating them using STATA. The percentage levels of the population based who measured for depression in 2017 based on the functional status that they had, could also be established through cross-tabulation commands using the same program. At this bivariate level of analyses, Chi-square tests of associations were also programmed for baseline estimates of each selected characteristic and depression in 2017. This was done in order to test for significance at the descriptive level. Prevalence rate of depression could also be calculated manually based on percentage levels of depression, using the following equation:

***NUMBER OF CASES/TOTAL POPULATION**

In the case of this study prevalence percentage rate was obtained by dividing the number of depressed individuals in 2017 over the total number of individuals within the population.

3.9.3) *Determining the relationship between Functional status and depression in 2017*

After univariate and bivariate analysis was executed, in order to understand the differential effects of sensory and physical impairment on depression, the perfect model of regression had to be used which would suit the nature of the data that was being used. Ultimately. a mixed effects logistic regression model proved to be useful in terms of the main objective of the study. Needing to understand the effects of accumulating demographic and socio-economic factors in relation to depression required use of appropriate statistical technique. As some variables were fixed and most variables were variable, a mixed effects approach was better for accounting for both these effects and allowed for more accurate and wholistic results regarding their relationship to depression (UCLA, 2020) as opposed to a fixed-effects approach or random-effects approach. Two models for the mixed effects regression were used. The first model was an unadjusted mixed effects regression model whereby the relationship between each independent variable to depression could be established without the combined effects of other selected factors. The Adjusted model was run to establish the combined effects on depression of all the factors together. Its equation is as follows:

$$Y = X\beta + Zu + \varepsilon$$

Where y is the outcome variable, or an observable data vector. In this case *depression*; X is the design matrix of the predictor variables (*Sex, age, race, geotype etc.*); β is a vector of the fixed effects regression coefficients (the βs); u is the vector of the random effects (the random complement to β); Z is the design matrix for the random effects (the random complement to the fixed X); and ε is a vector of random errors (Gumedze & Dunn, 2011; Dem´etrio, 2012)

CHAPTER 4: RESULTS

4.1) The population distribution of South African adults based on their Changing and Unchanging socio-demographics characteristics.

Table 4.1 displays the percentage distribution of the population for unchanging factors (sex and age). Approximately 54 % of the sampled population were female. Majority of them were of African ethnicity (85%). This was followed by those who were Colored (9%), White (3%) and Indian/Asian (1%). Table 4.2 reflects percentage distribution of changing factors across all three years. Majority of the population were adults aged 16 to 25 in the year 2008. (37%). This percentage was followed up by those who were from the ages of 26to 35 years old (22%) and those who were between the ages of 36 to 45 20%). The percentage of individuals kept decreasing as age ranges escalated. Adults from the ages of 46 to 55 had the third lowest percentage of individuals and those 56 to 65 had the second lowest (10% and 5% respectively). Those above the ages of 65 years old and the lowest group percentage (2%). The percentages of individuals for each age -category increased with age as the years progressed. Populations aged 15 to 19 were majority of the population in both 2012 and 2017 (21% for both). Most of the sample resided in Urban formal locations (49%), this percentage was followed by populations who resided in Tribal Authority Areas (34%), informal residents (10%) and finally, those who resided in rural areas (6%). This was apparent across all three waves (2012; 51%, 31%, 10% and 6%. 2017; 51%, 28%, 10% and 8% respectively).

Individuals who smoked in 2008 made up only 19% of the population. This percentage did not fluctuate greatly in 2012 and 2017 (18% and 19%). The rest indicated otherwise. Most of the population declared that they rarely consumed alcohol in 2008 and 2012 (77% and 73%). Of the entire population, 2% declared that they consumed it weekly in 2008 while this percentage increased to 3% in 2012. The percentage of moderate consumers of alcohol increased from 19% in 2008 to 22% in 2012. Data on alcohol consumption was unavailable for the year 2017.

Most of the population identified with being nuclear family members of the household heads. Again, this was consistent in all three years (44%, 49% and 44%). The percentage of the population who identified with being heads of the households decreased from 2008 to 2012 (40% and 18%) and increased by 6% in 2017 (24%). Unrelated household members accounted for only 1% of the population in 2008 and 2012, while this percentage increased by 1% in 2017 (2%).

The percentage of the population who were employed increase steadily as years progressed (29% in 2008, 37% in 2012 and 46% in 2017). Most of the individuals perceived their household wealth status as average (50% in 2008, 52% in 2012 and 55% in 2017), followed by those who saw their household wealth status to be low showing a decrease in percentage across the years(45% in 2008, 43% in 2012 and 41% in 2017). The percentage of those who perceived their household wealth status to be 'high' remained consistent (3%) Majority of the sample spent less than R2000 on food in the last month for 2008, 2012 and 2017. This did decrease across years however (94%, 90% and 84%). Approximately 0.7% confirmed that they had spent more than R5000 on food in the last month, this increased to 1% in 2012 and remained at that percentage in 2017

TABLE 4.1: Frequencies and Percentages of sample by fixed characteristics from 2008 (weighted)

SELECTED SOCIO- AND DEMOGRAPHIC FACTORS	N	%
SEX		
Male	2,274,678	**45.22**
Female	2,277,124	**54.78**
RACE		
African	4,306,016	**85.61**
Colored	438,478	**9.61**
Indian/Asian	67,213	**1.34**
White	173,093	**3.44**

(N=5,029,801)

TABLE 4.2: Frequencies and Percentages of sample by random characteristics (weighted)

	2008		2012		2017	
SELECTED SOCIO- AND DEMOGRAPHIC FACTORS	N	%	N	%	N	%
DEMOGRAPHIC						
AGE						
15-19	856,644	**17.03**	*	*	*	*
20-24	922,865	**18.35**	1,063,488	**21.14**	*	*
25-29	642,355	**12.77**	846,558	**16.83**	1,063,488	**21.14**
30-34	529,599	**10.53**	646,735	**12.86**	847,041	**16.84**
35-39	530,545	**10.55**	471,689	**9.38**	646,252	**12.85**
40-44	463,795	**9.22**	540,053	**10.74**	471,689	**9.38**
45-49	382,009	**7.59**	473,611	**9.42**	540,385	**10.14**
50-54	222,143	**4.42**	328,088	**6.52**	473,279	**9.41**
55-59	175,356	**3.59**	214,779	**4.27**	327,019	**6.50**
59<	304,487	**6.05**	444,796	**8.84**	660,644	**13.13**

GEO TYPE						
Rural, formal	307,857	**6.12**	330,045	**6.56**	427,813	**8.51**
Tribal Authority Areas	1,729,954	**34.39**	1,580,488	**31.42**	1,455,362	**28.93**
Urban Formal	2,486,117	**49.43**	2,593,743	**51.57**	2,599,705	**51.69**
Urban Informal	505,873	**10.06**	525,525	**10.45**	546,921	**10.87**
BEHAVIORAL						
SMOKING						
Yes	956,368	**19.01**	911,492	**18.12**	982,028	**19.52**
No	4,073,433	**80.99**	4,118,309	**81.88**	4,047,773	**80.48**
ALCOHOL CONSUMPTION						
Rarely	3,901,547	**77.57**	3,706,065	**73.68**	*	*
Moderately	1,004,441	**19.97**	1,136,667	**22.60**	*	*
Weekly	123,813	**2.46**	187,069	**3.72**	*	*
PSYCHOSOCIAL						
RELATIONSHIP TO HH HEAD						
HH head	2,033,302	**40.43**	923,994	**18.37**	1,246,772	**24.79**
Nuclear	2,252,606	**44.79**	2,514,191	**49.99**	2,232,301	**44.38**
Extended	656,734	**13.06**	1,539,942	**30.62**	1,433,304	**28.50**
Other	87,158	**1.73**	51,673	**1.03**	117,424	**2.33**
ECONOMIC						
CURRENTLY BEING PAID						
Yes	1,487,320	**29.23**	1,883,017	**37.44**	2,356,367	**46.85**
No	3,542,482	**70.43**	3,146,784	**62.56**	2,673,434	**53.15**
PERCEIVED HH WEALTH						
STATUS						
Low	2,318,832	**45.10**	2,207,559	**43.89**	**2,104,729**	**41.85**
Average	2,524	**50.20**	2,634,888	**52.39**	**2,771,722**	**55.11**
High	186,053	**3.70**	187,353	**3.72**	**153,349**	**3.05**
MATERIAL						
FOOD TOTAL						
<2000	4,736,061	**94.16**	4,529,902	**90.06**	**4,299,284**	**84.68**
2000-5000	254,998	**5.07**	421,052	**8.37**	**715,935**	**14.23**
5000<	38,741	**0.77**	78,847	**1.57**	**54,582**	**1.09**

(N=5,029,801) (*unavailable)

4.2) Percentage distribution of functional status for 2008, 2012 and 2017, percentage prevalence for depression, and percentage distribution of depression by functional status and selected socio-demographics for 2017.

Figure 4.1 is a representation of the percentage of the sample based on their functional status. About 1% of the selected population were had a sensory impairment or were physically

handicapped. 99% were unimpaired, reflecting the severe disproportion between the number of people that have an impairment within RSA, and those who do not.

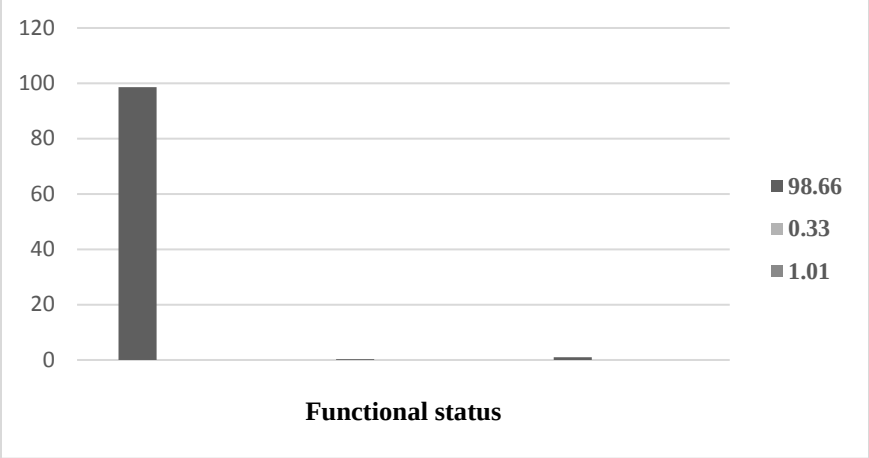
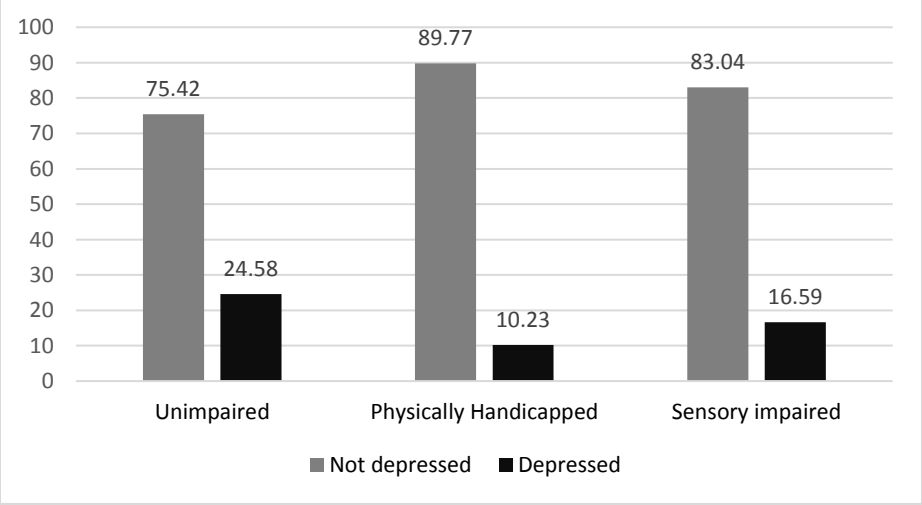


Figure 4.1: Percentage levels of the sampled population by functional status (2017)

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Figure 4.3 is a graphical representation of the percentage distribution of functional status by depression in 2017. Individuals who were unimpaired had majority of depressed individuals in 2017 (25%), following this percentage were those who were sensory impaired (11%) and those who were physically handicapped (9%).



N= 5,029,801 chi2=0.2.03; p-value=0.361

Figure 4.2: Percentage Distribution of depression in 2017 by functional status.

Cross-tabulations revealed percentage distribution of depression based on fixed selected controls of the sample which can be seen in table 4.3. The results indicated that by the year 2017, 27% of those who were depressed were male while 25% of females measured for depression according to the CESD-10. Amongst the Colored population, 17% were depressed in 2017 while most of those who were depressed were African (26%). 18% Of the Asian/Indian population, 13% of them were depressed. The population group with the lowest percentage of those who were depressed were White. (8%). Table 4.4 on the other hand, is a depiction of the random selected controls by depression most recently (2017). Adults in the age range of 56 to 59 had the highest percentage of those who were depressed in 2017 (28%). This was followed by individuals from the ages of 26 to 35 (26%) and those from the ages of 36 to 45 (25%). Elderly populations above the age of 65 and those under the age of 25 had the lowest number of depressed individuals with shared estimated of 21%. 23% of those who were depressed were between the ages of 46 to 55. Geographical Location showed that most of the sampled population who were depressed in 2017 came from Urban, formal locations (27%). Those who came from Urban but informal locations had an equal percentage of depressed individuals. The group with the second least percentage of depressed individuals were those who resided in Traditional Authority Areas (24%) with rural, formal residents being the group with the least number of depressed adults (18%).

In terms of behavioral indicators, the population who confirmed that they smoked had a higher percentage of individuals who were depressed compared to those who confirmed that they did not smoke (28% and 23% respectively). With regards to relationship to household head, the proportion of individuals who claimed that they were household heads were most depressed in 2017 (26%). Those with the second highest percentage of depressed individuals were identified as being nuclear family members (25%). Out of the extended family members, 24%% of measuring for depression in 2017. Those who identified as 'other', or as not being a relative to the household head, had the lowest percentage of depressed adults in 2017 (9%).

Results revealed that those who consider their wealth status as low had the highest percentage of depressed individuals in 2017 (30%), this was followed by those who considered theirs to be average (21%). Those who considered their household wealth as high had the lowest number of adults measuring for depression followed by those who claimed their wealth to be 'average' and

'low' (12%). Out of those who were being paid or receiving an income at the time, 22% were depressed by the year 2017. 27% of those who were receiving an income also measured for depression in that year. Considering total food expenditure, it is evident that those who spent more than R5000 in the previous month had the lowest percentage of depressed individuals, followed by those who spent between R2000 and R5000 (2% and 22%). Lastly, those whose food expenditure was less than R2000 in the previous month, formed majority of those measuring for depression in the year 2017 (25%). Overall, the prevalence percentage rate of depression was 0.024 in 2017.

Table 4.3: Frequencies and percentages of fixed demographics (2008) by depression in 2017

SELECTED CHARACTERISTICS	NOT DEPRESSED N	%	DEPRESSED N	%
DEMOGRAPHICS				
SEX				
Male	1,736,769	**76.35**	537,908	**23.65**
Female	2,629,431	**74.88**	692,180	**25.12**
Chi2= 8.90 p-value:0.003				
RACE				
African	3,183,057	**73.92**	1,122,958	**26.08**
Colored	560,663	**82.69**	83,704	**17.31**
Asian/Indian	58,242	**86.65**	8,971	**13.35**
White	158,639	**91.69**	14,454	**8.35**
Chi2=44.74 p-value:0.000*				

(N=5,029,801

Table 4.4: Frequencies and percentages of random Socio-demographics by depression in 2017 (weighted)

SELECTED CHARACTERISTICS	NOT DEPRESSED N	%	DEPRESSED N	%
DEMOGRAPHICS				
AGE				
25-29	822,970	**77.38**	240,517	**22.62**
30-34	611,640	**72.21**	235,400	**27.79**
35-39	485,038	**75.05**	161,214	**24.95**
40-44	347,162	**73.60**	124,526	**26.40**
45-49	419,297	**77.59**	121,088	**22.41**
50-54	367,594	**77.67**	105,685	**22.33**
55-59	233,900	**71.53**	93,118	**28.47**
59<	512,107	**77.52**	148,537	**22.48**
Chi2=0.92 p-value:0.960				
GEOGRAPHICAL LOCATION				
Rural formal	335,058	**78.32**	92,755	**21.68**
Tribal Authority Areas	1,109,309	**76.22**	346,052	**23.78**
Urban Formal	1,982,944	**68.09**	791,280	**31.91**
Urban Informal	3272,401	**68.09**	174,520	**31.91**
Chi2=9.31 p-value:0.025*				
BEHAVIORAL				
SMOKING				
Yes	706,560	**71.95**	275,468	**28.05**
No	3,093,152	**76.42**	954,620	**23.58**
Chi2=2.41 pvalue:0.120				
PSYCHOSOCIAL				
RELATIONSHIP TO HH HEAD				
HH head				
Nuclear				
Extended	923,376	**74.66**	323,395	**25.94**
Other	1,684,114	**75.44**	584,185	**24.56**
Chi2=2.60 p-value=0.456	1,084,696	**75.68**	348,607	**24.32**
	107,524	**91.57**	9,900	**8.43**
ECONOMIC				
CURRENTLY BEING PAID				
Yes	1840623	**78.11**	515,743	**21.89**
No	1,959,089	**73.28**	714,344	**26.72**
Chi2=27.97 p-value:0.000*				
PERCEIVED HH WEALTH STATUS				
Low	1,478,379	**70.24**	626,349	**29.76**
Average	2,187,084	**78.91**	584,637	**21.09**
High	134,248	**87.54**	19,101	**12.46**
Chi2=39.58 p-value:0.000*				

MATERIAL				
FOOD TOTAL				
<2000	3,185,695	**74.79**	1,073,588	**25.21**
2000-5000	560,663	**78.31**	155,271	**21.69**
>5000	53,353	**97.75**	1,228	**2.25**
Chi2=19.82 p-value:0.000				

p-value <0.05 level of sig (*statistically significant) (N=5,029,801) (note: data on Alcohol consumption for 2017 unavailable)

4.2) The Relationship Between depression and Functional status

Table 4.5 depicts the effects of all fixed demographic factors on depression and includes the main independent variable. In the absence of demographic, socio-demographic, behavioral and psychosocial factors, a relationship was found between being physically handicapped and depression [O.R:0.34; P-value: 0.016; C.I:0.148-0.823].

A non-statistically significant relationship was found between Sex and depression at wave 5 P-value:0.0340; O.R:1.08 C.I:0.919-1.276]. The cumulative effects of Race and Geographical type were statistically significantly related to depression in 2017. The Colored population was less likely to be depressed at the end of the study when compared with the likelihood for depression amongst the African population [P-value:0.001; O.R; 0.59; C.I: 0.438-0.802]. This was also true for Indian and Asian populations as well as those who were white [p-value: 0.052 and 0.000; O.R: 0.43 and 0.25; C.I: 0.228- 0.833 and 0.148- 0.449, respectively].

In terms of the random controls, in table 4.6 those who lived in urban, informal areas were more likely to be depressed in 2017 than those who were rural residents [P-value:0.000; O.R:1.87; C.I:1.319-2.677]. Perceived wealth status was significantly related to depression in the presence of no other social factors with those who believed their wealth status to be average or high being less likely to experience depression in 2017 [p-value: 0.000 and 0.002; O.R: 0.74 and 0.42; C.I: 0.6371- 0.8785 and 0.246-0.718]. Those who identified themselves as being unrelated to the head of the household were less likely to develop depression than the household heads themselves [P-value: 0.041; O.R: 0.48; C.I: 0.241-0.970]. All other controlled factors such as receiving an income, smoking, alcohol usage and age, were non-significantly related to

depression in 2017 [all p-values for these variables were below the 0.05% level of statistical significance].

The adjusted results (italics) from table 4.5 reflect a relationship between all fixed controls and depression. the relationship between functional impairment and depression was found [P-value: 0.051]. Physically handicapped individuals were less likely to be depressed than those who were unimpaired [O.R: 0.34; C.I: 0.1159- 1.0027]. Sex and depression were also statistically significantly related with females being more likely than males to develop it in 2017 [P-value:0.053; O.R: 1.23; C.I: 0.9971-1.5390]. Race and depression proved to be statistically significant when all other factors were accounted for. Adjusted results indicated that the Colored and white population were less likely to be depressed in 2017 than the African population [P-value:0.001 and 0.000; O.R: 0.52 and 0.26; C.I:0.350-0.776 and 0.127-0.539].

The only random control that was statistically significantly related to depression in 2017 when adjusted for was geographical location, specifically if the population resided in urban, informal areas [p-value: 0.024]. Results indicated that the likelihood for depression among those who resided in such locations was higher than for those who resided in rural locations [O.R:1.67; C.I:1.069-2.638].Adjusted results revealed that the relationships between smoking, alcohol usage, age, perceived wealth status, currently receiving pay or not, relationship to household head and food expenditure were statistically non-significantly related to depression [p-values>0.005 level of significance.

Table 4.5: Unadjusted and Adjusted Mixed-Effects Logistic Regression Results for fixed controls (Weighted)

SELECTED FACTOR	ODDS RATIO	P-VALUE	CONFIDENCE INTERVAL
SEX			
Male	**RC**		
Female	1.08	0.340	0.9192-1.2767
	1.23	*0.053**	*0.9971-1.5390*
RACE			
African	**RC**		
Colored	0.59	0.001*	0.4389-0.8024
	0.52	*0.001**	*0.3505 -0.7764*
Asian/Indian	0.43	0.052*	0.2285-0.8339
	0.53	*0.144*	*0.2265 – 1.2409*
White	0.25	0.000*	0.1484-0.4492
	0.26	*0.000**	*0.1276- 0.5397*

Table 4.6: Unadjusted and Adjusted Mixed-Effects Logistic Regression Results for random controls (Weighted)

SELECTED FACTOR	ODDS RATIO	P-VALUE	CONFIDENCE INTERVAL
AGE	0.99	0.498	0.9937-1.0030
	1.00	*0.695*	*0.9952- 1.0072*
GEO. TYPE			
Rural (RC)	**1**		
Tribal Authority	1.04	0.739	0.7975-1.3758
	0.84	*0.358*	*0.5987 - 1.2039*
Urban, formal	1.06	0.650	0.8090—1.40
	1.06	*0.715*	*0.7581 -1.4973*
Urban, Informal	1.87	0.000*	1.31952.6775
	1.67	*0.024*	*1.0692 – 2.6385*
ALCOHOL CONSUM.			
Never (RC)	**1**		
Rarely	0.83	0.150	0.6588 - 1.0657
	0.89	*0.455*	*0.6592- 1.2051*
Weekly	1.38	0.308	0.7407- 2.5841
	1.57	*0.205*	*0.7791- 3.1926*

SMOKING			
Yes (RC)	**1**		
No	0.84	0.128	0.6765- 1.0504
	0.72	*0.069*	*0.5063- 1.0257*
RELATIONSHIP TO HH HEAD			
HH head (RC)			
Nuclear			
	1		
Extended	0.99	0.933	0.8207 -1.1987
	1.02	*0.0843*	*0.8134 -1.2878*
Other	0.96	0.721	0.7701 - 1.1987
	0.94	*0.712*	*0.7198 - 1.2515*
	0.48	0.041*	0.2411 -0.9704
	0.63	0.286	0.2700- 1.4720
HOUSEHOLD WEALTH			
Low (RC)	**1**		
Average	0.74	0.000*	0.6371 -0.8785
	0.86	*0.173*	*0.7094 - 1.0635*
High	0.42	0.002*	0.6371-0.8785
	0.57	*0.097*	*0.3032 - 1.1043*
CURRENTLY BEING PAID			
Yes (RC)	**1**		
No	1.16	0.083	0.9797 - 1.3904
	1.03	*0.796*	*0.8141 - 1.3074*
FOOD EXPEN.			
<R2000 (RC)	**1**		
R2000-R5000	0.75	0.055	0.5650 - 1.0063
	0.99	*0.989*	*0.6490 - 1.5315*
R5000<	0.14	0.003*	0.0419 – 0.5237
	0.28	*0.094*	*0.0644- 1.2380*
FUNCTIONAL STATUS			
Unimpaired (RC)	**1**		
Physically Handicapped			
	0.34	0.016*	0.1483 - 0.8239
Sensory Impaired	*0.34*	*0.051**	*0.1159 – 1.0027*
	0.62	0.294	0.2617 – 1.5007
	0.62	*0.418*	*0.2052 – 1.9310*

p-value<0.05 (*statistically significant) *italics*=Adjusted results

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1) **Discussion**

The present study aimed to investigate the relationship between Unimpaired, physically handicapped and sensory impaired South African adults, aged 16 and above. Studies up to date have focused on the association between physical *illnesses* (considered as debilitating) and depression, rather than on individuals who have either a congenital or an acquired physical or sensory impairment with the absence of such illness (e.g. Suliman et al. (2010)). The present study aimed to shed light on hoped to shed light on this by investigating the relationship between unimpaired, physically handicapped and sensory impaired South African adults, aged 16 and above, who did not have other transmittable or man-made illnesses. The following is a discussion of the implications of the findings from the present study by addressing the sub-objectives of the study first and then understanding what has come to light from the main objective.

The first objective of the study was to get a description of the sample across all three years (2008, 2012 and 2017). It is noted that most of the population were African and in terms of economic indicators and food expenditure, most of the population were not being paid, perceived their household wealth to be low and spent below R2000 of household food expenditure in the last month. This trended throughout all three years. Considering that unemployment was only projected to reach the 37% mark by the year 2017 according to the Development policy research unit (2018), it is alarming that 70% of this sampled population were not being paid in 2008. What can be said though, is that the percentages of the unemployed population did decrease from 2008 to 2017, although steadily which could be a positive reflection on resource and job availability. It is worth noting that urbanization has been on the rise and has been shown to increase from 27% in 1950 to 40% in 2015 (UN-DESA, 2014). Another study found that in 2019, 66% of the population were urban dwellers. From the presented study, it can be gathered that by 2008, 59% of the population was already settling in urban areas and that this increased to 61% in 2017. This finding does reflect the continuing rise of urbanization (Tacoli, 2017)

When considering descriptive results, 80% of the population reported that they did not smoke in 2008. This percentage increased very slightly in 2012 and decreased back to 81%. One study found that the prevalence of smoking was 17% in the year 2012, indicating an increase in incidence percentage rate by 3% from the year 2015 to the year 2017, drawing attention to close

surveillance of risk factors of tobacco- use to ensure that control measures are still effective *(*Reddy, Zuma, Shisana, Kim & Sewpaul, 2015*)*.The second objective of the study was to determine the percentage levels of the population by functional status, the prevalence percentage for depression and the percentage levels of depression by functional status and selected controls. In terms of functional status, the amount of unimpaired people far exceeds those who are functionally impaired). This contrasts with the number of impaired individuals found in other studies. In a separate study done in RSA, the proportion of people who were unimpaired was 14%, the researcher did not account for distribution of the sample based on sub-categories of impairment however (Moodley & Graham, 2015). Statistics of South Africa confirmed that the prevalence of disability in general was 7.5%. One finding from revealed that within South Africa, hearing impairment alone is faced by 7.5% of the entire population. Noh, Kwon & Park (2016) in their study found that they could not even sub-categorize the types of impairment because the sample sizes were too small or less than 0.1%. Variations in sample size may be responsible for varying prevalence rates between the current study and others. Attrition was also a factor that affected the true sample size of those unimpaired as well as impaired. The study is consistent however with findings which reveal that there is a greater percentage of sensory impaired individuals than those who are physically impaired (Çağan & Ünsal, 2014; Statistics South Africa, 2011). The prevalence of depression was lower here than in other local studies. For instance, found that the prevalence of depression was 4.9% for the entire population. More comparable results are needed to effectively compare prevalence rates as prevalence rate of depression was measured for the 12 months before the interview whereas the present study measured depression for a two-week period before enumeration. It can be said however, that the burden of depression is indeed growing because 24% of the population who were not depressed were now depressed in 2017. The percentage of depressed individuals from 2017 were mostly unimpaired. This is most likely because results from this study indicated that they are most likely to develop depression. Analysis revealed that by the year 2017, 23% of the female population and 20% of males measured for depression. Given that the prevalence percentage was 20% and 7% for men 4 years prior to this study, these percentages indicate the growing burden of depression among both genders within South Africa (Nduna, 2013). Of note is also the low percentage of those who were depressed who were receiving pay and how this differs to the 80% of working individuals who were identified as being depressed according to Gorringe et al.

(2020). Most of those who measured for depression were smokers. This finding was unlike the results found from other global studies such as one within the USA which resulted in a higher prevalence of depression amongst ex-smokers and those who currently and previously did not smoke (Husky, Mazure, Paliwal & McKee, 2008).

The main objective of the study was to analyze the relationship between functional status and depression. Most studies point to the increased risk for depression which sensory impaired individuals face compared to the general population but results from the present study reveal the opposite. Drawing attention two unadjusted results, the relationship between functional status and depression was significant. This remained significant however, and in both cases physically handicapped individuals were less likely to become depressed in 2017, than the unimpaired population. (Holmes-Rovner et al., 1996). Few international studies discovered opposite findings. The depression sensitivity test conducted in Asia, for example regarding severity of impairment and its effect on depression resulted in a non-statistically significant relationship existed between the two (Noh et al., 2016). The study which assessed functional impairment and its correlation with depression within 5 income-varying countries revealed that the odds of becoming depressed were increased if individuals were either sensory or functionally impaired (Wallace, Mactagart, Banks, Polak & Kuper 2020)). Furthermore, hearing loss was showed no clear association with depression. Based on evidence from these LMIC countries, the answer to why sensory impairment had no effect on depression within the present study may lie in the fact that the differing forms of sensory impairment were categorized together. In the study by Wallace, Mactagart, Banks, Polak and Kuper (2020) hearing and visual impairments were analyzed separately in relation to depression and thus the researchers were able to establish their individual effects on depression. A few studies have also noted the significant relationship between impairment and depression becoming weaker when other factors are adjusted for (Zhang, 2016). In a local study by Bozzay, O'Leary & De Nadai et al. (2017), it was found that among hearing impaired adolescents, sources of depression were identified as communication difficulties and negative societal attitudes. Within RSA there is evidence that points to the severity of limitations being related to depression rather than the condition itself (DSPD & DESA, 2016). These studies reflect the mediating effect of certain factors which may have been lost in the present study, such as severity in doing daily tasks and severity of hearing loss because such measures were unincorporated. Within RSA there is evidence that points to the

severity of limitations being related to depression rather than the condition itself (DSPD & DESA, 2016). This means that if South Africa had to cater for any avenues of that would improve the overall wellbeing of SA, a great amount of resources and funding would have to be allocated to the general population, given that they are more at risk for depression than those with functional different abilities and form majority of the country (Assari, 2017).

Race, sex, geographical location and perceived household wealth all proved to be quite important in controlling for factors that affect depression besides functional status. In the absence of other contributing effects, a non-significant relationship between sex and depression was found. This, like findings in across countries, emphasizes the higher risk that women have for acquiring depression (McHenry and Carrier et al., 2014). Such a finding is aligned with those by Thapa (2014) which was an insignificant relationship between sex and depression within South Africa but rather found one to exist within Ghana. As this study reveals, gendered effects are not as clear- cut as they seem, and studies need continue to shed light on mental health and gender among unimpaired and impaired populations. The present study might however reflect similar findings to that of many other global studies such as that by Noh, Kwon and Park, et al. (2016) who noted gender as a moderating variable rather than a risk factor. Race has played a great part in depression globally, regionally and locally with ethnic minorities being more likely to face depressive symptoms than the white population (Dunlop, Song, Lyons, Manheim and Chang, 2003). Likewise, the results are replicated here, and the effect of race is still felt by non-white populations.

A relationship between geographical location and depression was found with urban informal dwellers more likely to be depressed. Conditions that come with living in informal settlements are risky for developing depression, and some of these conditions include inaccessibility to potable water; security of tenure; access to sanitation; and an adequate living environment (UN-Habitat, 2015). Conditions such as these also serve as optimal breeding ground for spread of infections; higher incidence of respiratory infections and conditions which include asthma and injuries; and the prevalence of mental disorders, including depression and stress as a result of marginalization and spatial segregation (UN-Habitat, 2015; Gordon, 2007; WHO, 2010). Also, most of the shift to urbanization has occurred amongst populations of color because of forced segregation during the Apartheid era (Massey, 2015). This shift in urbanization has also caused a

shift in the focal areas where food insecurity has become high (Tacoli, 2017). Given that dispensation of grants has also improved for populations residing within rural areas it is also plausible that likelihood for depression would be lower among this population.

Global literature has asserted the significant effect that subjective social standing has on mental health (Mutyambizi et al., 2019; Demakakos et al., 2008). In line with such findings, results from the study revealed that the perceived wealth status of the population was significantly related to depression independently, with those who believed their wealth status to be 'high' being less likely to be depressed. There is evidence outlining the link between race and inequality in the prevalence of SSS-related symptoms of depression (Mutyambizi et al., 2019). Due to the severity of inequality that still exists within South Africa because of race, this is plausible in explaining why the relationship between depression and perceived wealth status disappears when effects of race on depression are also accounted for (Charasse-Pouélé, 2006; Institute for Health Metrics and Evaluation [IHME)], 2017).

Few global studies have come to conclude that age and risk for depression are in fact proportional. Such a study is that by Schaakxs, Comjis & Lamer (2018) found that the relationship between depression and increasing age was significant, indicating that that older individuals having an increased susceptibility to depression except in the context of social risks. The current study found no significant relationship between depression and increasing age alone, as well as in the presence of other factors. A study focused within the South African context concluded that adults within the 40-49 age- range are more likely to acquire depression than any other age group (Thomilson et al., 2009). In line with this, Verhaak et al. (2014) found that within R.S.A, depression due to limitations in Self-care, and participation in social services was particularly impacted on 'young' elderly people. Other depression-based studies on age-groups have taken a developmental approach in understanding increased age and risk for depression. In one study by Mirowsky & Ross (1992), levels dipped for 40 to 50- year old age groups and proceeded to raise from the ages of 80 (Mirowsky & Ross, 1992). The mixed results from such studies, both global and local, emphasizes the continuous research that must be undertaken to understand the complete sphere of age and contextually applicable factors which result in depression amongst South Africans.

International studies assessing substance use and its effect on depression show that smoking exacerbates depression while alcohol-usage potentially modifies depressive symptoms (Park et al., 2012). According to results from the current study, effects of Alcohol usage and the effects of smoking were not responsible for depression, both when adjusted for and independently. Even though these results contradict many other findings regarding substance-use and depression, caution must be taken in interpreting the effects of alcohol consumption because data on it was absent from 2017.

Those with functional impairments have been identified, according to Burns and Lippold (2009), to have a strong social network. An international study assessing social support amongst populations with intellectual impairment and functional impairment found that the social network is stronger amongst those with functional impairment (Burns & Lippold, 2009). This international study may explain why findings from the present study indicate no effect of the relationship that the selected population have to their household heads and depression, when the main independent variable is adjusted for. If we consider the three perspectives of Social Support theory which affect health one- support from others buffers effects of stress and leads to better coping, two- an individual's self-esteem and self-regulation are significantly improved and therefore social support directly impacts health and, three- social support affects health because it provides companionship and intimacy (Cohen, Underwood, & Gottlieb, 2000). It cannot be assumed that a household measure such as relationship to household head, is an accurate reflection of whether support is in fact present or not. A recent study has also shown that the interactional relationship between the household head and the members of the household can affect the health of household members around them rather than one relationship affecting only those who are a part of it (Akinyemi, Banda & De Wet et al., 2020). It is

When food expenditure was assessed in its relationship to depression while being adjusted for, a non-significant relationship was found. Evidence pointing to the existence of an independent relationship between household food insecurity and poor mental health may be repeating itself here, because when unadjusted for, a significant association was found (Jessiman-Perreault & McIntyre, 2017). One study within the North West province of South Africa demonstrated similar results when finding that that higher food expenditure ($p<0.01$) was independently predictive of depression ($p<0.01$) (Docrat, Cleary & Christian et al., 2019). The present study

differs from that by Docrat, Cleary and Christian., et al. (2019) however in that higher- rather than lower-food expenditure decreased the odds of becoming depressed rather than vice-versa. Most of the population were exposed to effects of inflation from the year 2008 and therefore resorting to strategic cutting down on food costs in order to compensate for inflation may have applied to populations of low-, middle-, and high-income categories (Jacobs, 2009). Drawing from Engels law, it is expected that being forced to spend a greater amount on food in this period strengthened the risk for depression (Clements & Si, 2017). This was not the case however and clarification is needed on whether effects of having to spend more cautiously was taxing for those who were already battling food insecurity. Ultimately, food expenditure, perceived household wealth status and relationship to household head were related to depression but their effects were not strong enough to trump the effects of inequality seen through demographic and psychosocial factors such as race, sex, geographical location and functional status, the strongest indicators of depression.

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5.2) Conclusion

Prior to the study, the absence of studies focused around *functional* status was noted. The results displayed frequencies and percentage distributions of characteristics of the sample, in isolation as well as in relation to depression. Prevalence of depression was also ascertained according to percentage levels of depression in 2017. Regression analyses allowed a picture of the strength of each selected factor in relation to depression.

Based on the results of the study, the progress of sustainable development goals for 2030 is disheartening based on one goal. It is explicitly stated in goal number 3 of the SDG's that South Africa make progression toward optimal health and wellbeing. Results indicated that about one quarter of the population was depressed by the year 2017. This is an expected phenomenon according to the WHO whom identify depression as an expanding burden of disease and means that depression must continue to gain attention in terms of policy and research to continue the alleviation of it.

Results of the study indicate that race, geographical location and functional status are the primary risk factors for depression and that they mediate the effect of sex on depression amongst all other factors and this is important for two reasons. The first is that race and geographical location are still linked to inequality and the second is that contrary to what is expected (that impairment leads to depression), results indicate otherwise- populations with *functional* impairment (physically handicapped and sensory impaired), who are African, female and reside within urban, informal geographical locations are better off in terms of becoming depressed over the long term than populations who are unimpaired, female, of African ethnicity and residing in an urban, informal area.. This is concerning considering that most of those who are unimpaired are majority of South Africa's population. The fact that race and geographical location, all indicators of inequality, are still high -risk factors for developing depression means that inequality persists through these factors. Clearly the study does highlight however, that depression is less risky for those who are impaired.

5.3) **Recommendations**

5.3.1) Research

Half of the population is not receiving any form of pay, research must be conducted within the workplace. Organizations and institutions should be visited and statistics on the distribution of employees based on demographic factors should be enumerated. Based on analyses, political consensus must then be reached which address the disparities in organizations of workplace stemming from the data. Research should also consider the perceptions of employment which might be contributing to unemployment rates, and negatively affecting the mental health of those who are forced to attend work regardless of negative attitudes toward it (Ivandic et al., 2017). Future research should also continue to consider separate studies which focus on each age group, as opposed to attempting to study all age groups in one study (Covey, 2002). Such research should then take care to assess the specific social factors which are responsible for depression as populations reach them progress through these age groups.

In terms of functional impairment, research should also focus around the collating of data of representative size so that more studies on sub-categories of functional ability can be examined together and in separation. Functional impairment seems to be less of a risk for depression than being unimpaired. This result must be interpreted with caution as this can change given the context and time period in which this is assessed. Research should focus on collecting as much evidence pertaining to programs which have been successful in alleviating depressive symptoms for this population, or programs which have been successful in alleviating any other arena of inequality such as access to healthcare for this population.

It is recognized that there has been an increase in the uptake of grants for people of different ability including marginalized sub-populations such as African populations and those living in rural areas (South African Human Rights Commission, 2012). Through continuous assessment of grants closer inspection of its effect on job-seeking can be ascertained as evidence of the dependency and behavioral changes surrounding finances because of grants exists, either motivating or demotivating individuals to seek employment. (Devereux 2001; Gibson 2015).

5.3.2) Programmes

Programmes and policy should take heed in addressing the key factors identified as risky for the development of depression. As far as the SDG's of 2030 strive to alleviate many of the key problematic social factors, the idea 'small' wins should always be remembered. Urbanization is expanding and therefore focus needs to shift toward populations within these spaces where. efforts to address food accessibility can be installed (Massey, 2015).

In terms of the broader socio-economic context of South Africa, programmes which track the progress of development of facilities which cater for recreation, resources and services for those who live both in rural and urban areas. Routine Procedures which allow for the assessment of social needs can be effective, public and clinical health care workers can respond through on-site referrals or other social services (Beck, Klein, Schaffzin, Tallent, Gillam & Kahn, 2012). In the same way that lay counsellors have been proven to be effective in their role for providing emotional as well as resourceful support for individuals living with HIV/AIDs (Mwisongo, Mehlomakhulu, Mohlabane, Peltzer, Mthembu, & Van Rooyen, 2015), a more hands on approach should be implemented to tackle the mental health of the general or able population by recruiting such personnel to visit households in specific areas. Due to the poor lack of effort on the part of clinical and general health practitioners to expand or encourage the social support of patients (Cruwys, Dingle, Haslam , Haslam, Jolanda Jetten, Morton, 2013), part of the purpose of these visits should be not only to educate and promote mental health and the reduction of stigma surrounding it but also, to give an understanding of how effective a supportive household climate can be for buffering against negative mental health states (Cohen, Underwood, & Gottlieb, 2000). Promotion of community support can be beneficial for members of the household in terms of having a broader social network, whether related or unrelated to one another (Cacioppo, Fowler & Christakis, 2009). It has also been deemed as a buffer against food insecurity within urban areas (Mutisya, Ngware, Kabiru, & Kandala, 2016). Policy makers should target a reduction in the positive contribution of SSS to depression through the implementing of programmes that improve social welfare (Mutyambizi, et al., 2019). Intervening through recruiting of lay counsellors is also cost-effective, not only for organizations and government but also for those requiring the assistance (WHO, 2015).

5.4) Limitations

5.4.1) Attrition

The study used panel data which required that participants of the study be present for the years 2008, 2012 and 2017. Attrition was a major factor which cut down the amount of observations that could be used for the study (Caruana, Roman, Hernández-Sánchez et al., 2015).

5.4.3) Inconsistent Variables.

The study is also limited because it uses data from a source which has certain questions missing from future waves. This is because the questionnaires are adapted when each enumeration is about to proceed. Alcohol consumption was one of these variables as it was omitted from the last wave of the study (2017), but was still found to be useful to the study for two reasons; 1) alcohol usage is high within S.A particularly within areas like the Western Cape and is deemed as an impactful indicator of behavior both regionally and globally which is associated with mental health (van Heerden et al., 2009), and 2) the data pertaining to this variable was available for the years 2008 and 2012 which allowed for its effects on depression in 2017 to be understood to some degree at the very least.

5.4.4) Limitation of factors

The social determinants known to affect depression happen on many levels of society (Assari & Lankarani, 2017). This limited the number of controlled variables that could be used within the study. Such nuanced factors could not be determined in their relationship to depression not only because of restrictions in the data that was used but also because of time restraints.

5.4.5) Weighting Variable

Although the purpose of weighting is to improve the results of a study, weights are arbitrarily designed and make evaluation of standard error more difficult (Gelman, 2007).

5.4.6) Regression Analysis

In order to assess the effect of changing factors from three separate years in time, the mixed effects logistic regression was appropriate in that it accounted for variables which were fixed and susceptible from year-to-year. This form of regression does not account for the effects of time however and therefore truer estimates of the risks for depression can be established if the form of analysis can account for the 'time' aspect often lost in cross-sectional studies (Solem, 2015).

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APPENDIX A


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This proposal is submitted in partial fulfilment of the Master of Arts in Demography and Population Studies at the University of the Witwatersrand.
DATE: 19 June 2020
14
I, Paige du Preez declare that the following piece of work is due to my efforts alone and any contributions from other studies or pieces of work have been acknowledged through in-text reference. I acknowledge the full consequences should I be charged with any plagiarism offences.
SIGNED: PAIGE DEMI DU PREEZ