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Title: The effects of socio-economic factors on depression and perceived health status (PHS) among a cohort of young people (15-24) in South Africa: evidence from the National Income Dynamics Study (NIDS) waves 1-5.

Background

This study will look at the incidence of depression and reports of bad perceived health status (PHS) among a cohort of young people across the 5 waves of the South African National Income Dynamics Study (NIDS), and will examine the effect of socio-economic factors (education level, employment status and household wealth) on these two outcomes. South Africa is a middle-income country, with very high levels of socio-economic inequality. This study will generate evidence on the structural determinants of health and well-being in this context. With increasing attention being given to mental health issues within a population health context, we present much-needed evidence on the occurrence of depression at the population level and will analyse the relationship between depression and PHS.

PHS is a subjective measure of psychological and physical well-being (American Thoracic Society 2007; Jylhä 2009), while depression is a common disorder that affects the body, mood, thoughts and actions and can lead to an interference with the ability to work, sleep, eat and socialize (American Psychiatric Association ; The South African Depression and Anxiety Group). Both PHS and depression tend to be affected by socio-economic and environmental factors. The two outcomes will be investigated separately first, and then jointly because of the suspected association between how a person rates their health and whether they are depressed or not.

The apartheid era in South Africa created social and economic inequalities as a result of the different racialized groups that were created based on skin colour. These social and economic inequalities exist in post-apartheid South Africa and are also stratified by gender. Depression has recently been identified as a cause of disability in South Africa ranking 5th on the top ten causes of years lived with disability in South Africa in 2010 and 2017 respectively (Institute for Health Metrics and Evaluation 2019; Neethling I, Pillay-van Wyk V, Joubert J *et al.* 2017). This study will contribute to the body of knowledge on the social and economic factors

that matter for depressive symptoms and PHS among a cohort of young people between 2008 and 2017 in South Africa. While many studies have been conducted on the effect of socio-economic status on self-reported health, few studies have examined this relationship in a cohort.

PHS serves as a widely used measure of health by asking the question "How do you rate your health?" with responses on a Likert scale ranging from excellent to poor. According to Layes, Asada and Kephart (2012), there are two differences in PHS, the first difference comes from biological variation (functional variation) and the second difference comes from the perception and reporting of experiences differently. These differences reflect the knowledge, evaluation and/or social context of the value that is associated with duration of life, as modified by impairments, functional stress, perceptions and social opportunities that are influenced by disease, injury, treatment or policy.

Depression is said to cause feelings of sadness and/ or loss of interest in activities once enjoyed. The risk factors of depression include biochemistry, genetics, personality and environmental factors (American Psychiatric Association ; The South African Depression and Anxiety Group).

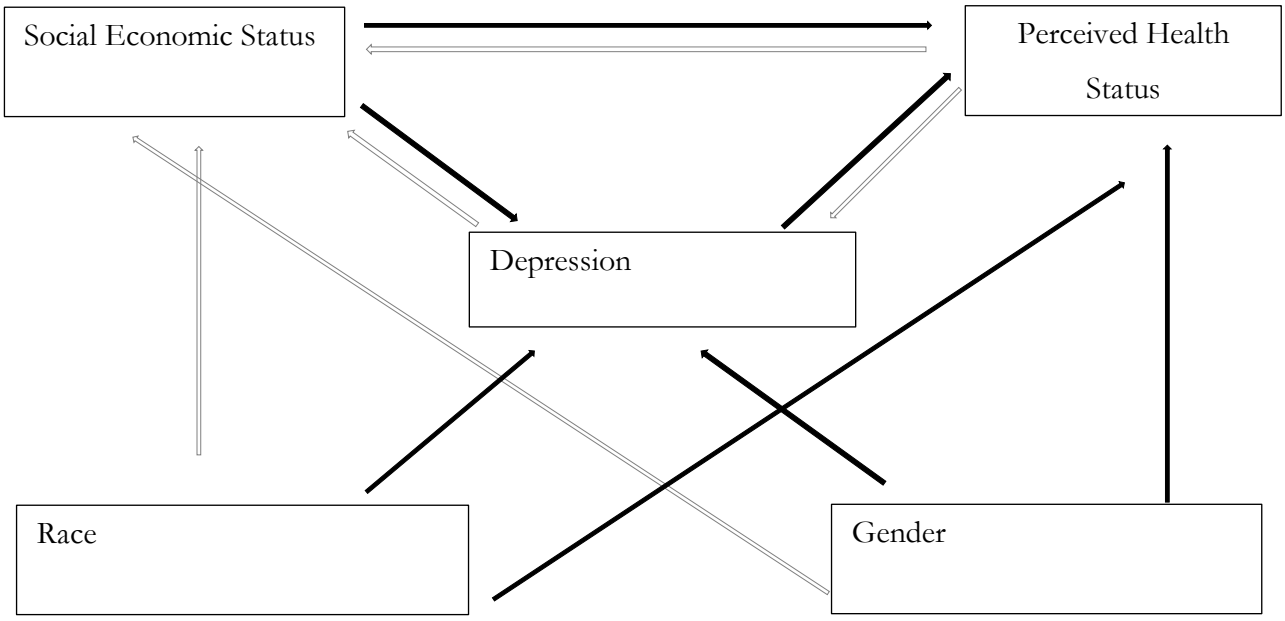
Some of the determinants of mental health and PHS relate to socio-economic status such as education, employment status, household income, age, race, gender and immigration status (among others) (Eyal and Burns 2016). A few studies have been conducted on the interactions between depression and SES. The study by Ardington and Case (2010) revealed that household expenditure per member and the number of assests owned by the households are significant negative correlates of depression, as is educational attainment.

Some studies such as that by Alvarez-Galvez, Rodero-Cosano, Motrico *et al.* (2013) highlight the importance of education in preserving a good general state of health. Other studies such as that by Layes, Asada and Kephart (2012) revealed that those with the least education were comparatively optimistic about their health while those with the most education were comparatively pessimistic about their health. According to Ardington and Case (2010), education is protective of both physical health and household economic status, all of which are protective of mental well-being.

Hallman (2005) cited by Bennett and Waterhouse (2018) identified that it is the intersection between socio-economic status and gender which can leave young women from lower socio-economic backgrounds vulnerable and that gender disparities exist in education and employment with women being disadvantaged. According to Krause and Jay (1994), an individual's personal assessment of his or her own health status is shaped to a significant extent by the social groups in which one is immersed.

This study acknowledges that bi-directional relationships exist between SES and Depression; between SES and PHS and between Depression and PHS. However, national and international literature suggest that the most common pathways are: SES having an effect on PHS; SES having an effect on Depression; and Depression having an effect on PHS (Alvarez-Galvez, Rodero-Cosano, Motrico *et al.* 2013; Ardington and Case 2010; Eyal and Burns 2016) and this is the conceptualisation applied in this study. The arrows on the theory of change diagram shown on Figure 1 are a depiction of the different directions that relationships among variables could take. This study investigates only the relationships indicated with solid arrows.

Figure 1: Theory of change model



Aim

The aim of the study is to explore the incidence of depression and poor perceived health status among a cohort of young people over a 9-year time period, as well as to examine the effect of Socio-Economic Factors (Education Level, Employment Status and Household Income) on depression and PHS.

Method

The data sets to be used are from NIDS waves 1-5. NIDS was conducted biannually from 2008 to 2017. The study began in 2008 with a nationally representative sample of over 28,000 individuals in 7,300 households across the country. NIDS is a first of its kind, face-to-face longitudinal survey that examines the livelihoods of individuals and households over a 9 year

period from 2008 to 2017 under themes that cover demographic, social and economic components (Brophy, Branson, Daniels *et al.* 2018).

To measure perceived health status, the NIDS asked the question "How would you describe your health at present? Would you say it is excellent, very good, good, fair or poor?". NIDS used the Centre for Epidemiological Studies Depression Scale (CES-D-10) to measure depression. According to Radloff (1977), the CES-D-10 scale is a short self-report scale designed to screen for depressive symptomatology in the general population (rather than for clinical diagnosis). The CES-D-10 scale is made up of 3 items on depressed affect, 5 on somatic symptoms and 2 on positive affect (Baron, Davies and Lund 2017). The questions asked whether in the past week behaviours and feelings related to depression occurred rarely or none of the time (less than 1 day), some or little of the time (1-2 days), occasionally or a moderate amount of time (3-4 days) and all of the time (5-7 days). For the negative questions, the scores range from 0 for the response rarely or none of the time to 3 for the response all of the time, while for the positive questions, the scores are reversed such that rarely or none of the time scores 3 and all of the time scores 0. Only scores for individuals that answered all 10 questions were computed. Similar to other studies conducted using NIDS data (Baron, Davies and Lund 2017), individuals scoring 10 or less will be grouped as not depressed and those scoring more than 10 as depressed.

Descriptive analysis will be conducted on both predictor and outcome variables and the results are presented as frequencies and percentages, as well as summaries showing between and within variation. Transition probabilities will be obtained to show the chances of transitioning in the different states of both the outcome and predictor variables. Mixed Effects Regression (MER) models containing both fixed and random effects will be run. MER models contain information regarding relationships between covariates and repeated responses by capturing correlations of repeated measures using random effects that serve to describe cluster-specific trends over time. Mixed effects models have an advantage of dealing with missing values and tend to be preferred over other methods (Garcia and Marder 2017). This study will make use of person identification (PID) as the grouping variable.

Results & Conclusion

The results of this study suggest that depression is more likely to occur in older than younger people, among females than males, among Africans than White, Coloureds and Indian/ Asian, among individuals who had completed neither secondary nor tertiary education and among unemployed and employed individuals than among not economically active individuals. Further the results suggest that bad PHS is more likely to be reported by younger individuals than older individuals, males than females, Coloureds and Asian/ Indians than Africans, individuals who

have completed some form of tertiary education than those who have completed neither secondary nor tertiary education, employed individuals than unemployed and not economically active and among individuals in households classified as having much above average income than all other income classes.

The descriptive statistics show that about 12% - 20% of the population at each wave were depressed and that less than 10% of the population at each wave reported bad PHS collectively. The transition probabilities show that chances are higher for transitioning from reporting bad PHS to reporting good PHS and for transitioning from depressed to not depressed. It is revealed that about 88% of the individuals reporting bad PHS transition to reporting good PHS and about 3% of the individuals reporting good PHS transition to reporting bad PHS. Further, about 16% of individuals who were not depressed transitioned to being depressed, while about 81% of individuals who were depressed transitioned to not depressed.

The regression results suggest that the odds of depression increase with age while the odds of reporting bad PHS reduce with age. Females were more likely to be depressed and less likely to report bad PHS than males. The odds of depression among other races were lower compared to those for Africans, with White people being 0.54 times less likely to be depressed compared to Africans. There appeared to be no statistical significance in odds of reporting bad PHS among the different races however the pattern of the odds suggests that Coloureds and Asians/ Indians are more likely to report bad PHS and Whites less likely to report bad PHS, as compared to the Africans.

The results further suggest that the odds of depression are 0.91 times smaller for individuals that have completed secondary education and 0.83 times smaller for individuals that have completed some form of tertiary education. The odds of reporting bad PHS are 1.45 times higher for individuals that have completed secondary education and 1.56 times higher for individuals that have completed some form of tertiary education. Individuals who are depressed are 0.49 times less likely to report bad PHS compared to those who are not depressed.

The results of this study are simialr to Alvarez-Galvez, Rodero-Cosano, Motrico *et al.* (2013) whose study revealed that social and economic circumstances have an impact on our physical and mental health. The results of this study are also consistent with those from the study by Alvarez-Galvez, Rodero-Cosano, Motrico *et al.* (2013) which further revealed that while individual economic conditions are an obvious basic factor contributing to a good state of health, socio-educational factors are more relevant to preserve it.

Completion of secondary education and completion of some form of tertiary education reduce the chances of being depressed. The completion of secondary education and of some

tertiary education both increase the odds of reporting bad PHS, perhaps because at this level of education one would be more aware about their own health and be able to report that they feel well or not. In post-apartheid South Africa, the effects of inequalities arising from apartheid-era social and economic policies are still present. The African individuals appear more at risk of suffering depression perhaps because, even though discriminatory policies were abolished, the social structures that were created have not been changed. In the final version of this paper, the conclusions will also discuss the validity of using PHS and the CES-D-10 scale as measures of well-being at the population level in the South African context.

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