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Health & Place

journal homepage: www.elsevier.com/locate/healthplace

Income inequality and depressive symptoms in South Africa: A longitudinal analysis of the national income dynamics study



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ARTICLE INFO

Article history:

Received 22 April 2016

Received in revised form

23 July 2016

Accepted 25 August 2016

ABSTRACT

Research suggests that income inequality may detrimentally affect mental health. We examined the relationship between district-level income inequality and depressive symptoms among individuals in South Africa—one of the most unequal countries in the world—using longitudinal data from Wave 1 (2008) and Wave 3 (2012) of the National Income Dynamics Study. Depressive symptoms were measured using the Center for Epidemiological Studies of Depression Short Form while district Gini coefficients were estimated from census and survey sources. Age, African population group, being single, being female, and having lower household income were independently associated with higher depressive symptoms. However, in longitudinal, fixed-effects regression models controlling for several factors, district-level Gini coefficients were not significantly associated with depressive symptoms scores. Our results do not support the hypothesis of a causal link between income inequality and depressive symptoms in the short-run. Possible explanations include the high underlying levels of inequality in all districts, or potential lags in the effect of inequality on depression.

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1. Introduction

Research suggests that income inequality may be a threat to population health, including both physical and mental health outcomes. Mechanisms by which income inequality is hypothesized to deleteriously affect health include psychosocial stress, such as through frustration induced by a heightened sense of relative deprivation, as well as reduced social cohesion and its sequelae, such as increased crime (Adjaye-Gbewonyo and Kawachi, 2012; Cifuentes et al., 2008; Kawachi and Subramanian, 2014; Pabayo et al., 2015). Ecological analyses among high-income countries indicate that income inequality may be more strongly correlated with mental illness (correlations of 0.73) than other health outcomes such as life expectancy, obesity, infant mortality, and homicide (Pickett and Wilkinson, 2015). However, much of the evidence linking income inequality to mental health outcomes fails to adequately address several important questions that might improve causal inference, including confounding and temporal order.

Major depression represents a growing segment of the global burden of disease. Major depressive disorder rose from the 15th

leading cause of global disability-adjusted life years to the 11th leading cause between 1990 and 2010, and depressive disorders contribute more to years lived with disability than other mental and behavioral conditions (Murray et al., 2013). In addition, while depression results in major morbidity in its own right, including risk of suicide, it has also been linked to greater risk of physical ailments such as cardiovascular disease (Hare et al., 2014; Rumsfeld and Ho, 2005).

Studies on income inequality and depression or other mental health outcomes have drawn on analyses of ecological data (Bouffard and Dubé, 2013; Hiilamo, 2014; Messias et al., 2011; Pickett and Wilkinson, 2015), which may be subject to the ecological fallacy or confounding by compositional characteristics of individuals in areas with different levels of inequality. A recent study by Hiilamo (2014) employed longitudinal data from municipalities in Finland for the years 1995–2010. Using fixed-effects methods, he examined whether changes in income inequality, as measured by the Gini coefficient, were associated with changes in depression. There was no association between changes in municipal Gini coefficients and antidepressant use, but, among older people, increases in municipal inequality were associated with decreases in antidepressant use. However, as noted in the limitations, the study was ecological. Therefore, it could not test whether municipal income inequality was associated with antidepressant use independently of individual income—that is, whether income inequality has a contextual effect on depression

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over and above the effect of income (Gravelle et al., 2002).

Several studies have used data at multiple levels to attempt to assess the contextual effect of income inequality on depression while controlling for individual-level factors, but most have been cross-sectional. For example, an international study using the World Health Surveys found that income inequality at the national level was not associated with individual risk of depression (Rai et al., 2013). Steptoe and colleagues observed a positive cross-sectional association between national income inequality and depressive symptoms among university students from 23 countries (Steptoe et al., 2007). A study based in the United Kingdom found income inequality to be associated with common mental disorders independently of individual income only among high-income individuals, while it had a protective association among low-income individuals (Weich et al., 2001).

Studies within the United States have generally found income inequality at the state, county, school, or neighborhood level to be associated with higher levels of depression or depressive symptomatology, but some results have been mixed or have failed to observe a detrimental effect of income inequality (Ahern and Galea, 2006; Goodman et al., 2003; Gresenz et al., 2001; Henderson et al., 2004; Muramatsu, 2003; Pabayo et al., 2014; Shi et al., 2002; Sturm and Gresenz, 2002; Zimmerman and Bell, 2006). In a recent prospective study, Pabayo et al. (2014) examined the association between state-level income inequality in the U.S. and major depression measured three years later and observed that income inequality was associated with increased risk of depression among women but not among men.

There have been recent calls to expand the test of the income inequality hypothesis as it relates to mental health in low- and middle-income countries (LMICs), particularly since these countries tend to have higher levels of inequality compared to high-income countries (Burns, 2015; Lund, 2015). However, there is still debate over whether absolute income is of more importance for health in LMICs compared to relative income. For example, in LMICs where large proportions of the populations may still live in poverty, health may be largely determined by poverty and absolute income rather than by relative income and inequality; the latter, as some argue, may have more import in high-income countries where much of the population already has basic needs met. A study by Cifuentes et al. (2008) found that, controlling for individual-level factors, income inequality was associated with major depressive episodes among countries in the top third of the Human Development Index (a measure of national development and well-being) but not in countries with lower Human Development Indices.

Other studies of income inequality in LMICs are suggestive of potential impacts on mental health, however; thus, highlighting the need for further research on this issue. Burns and Esterhuizen (2008) assessed the association between income inequality and presentation for treatment of psychosis in seven municipalities in a district in South Africa and found that municipality inequality was positively correlated with treated incidence of psychosis; however, the study was ecological and did not control for individual-level factors. Only a few multilevel studies controlling for compositional factors have been conducted within non-Western countries or in LMICs (Burns, 2015). Chiavegatto Filho et al. (2013) found that income inequality among municipalities within Sao Paulo, Brazil—a middle-income country with high levels of inequality—was positively associated with depression. By contrast, Fernandez-Nino et al. (2014) found no association between income inequality (at the locality, municipality, and state levels) and prevalence of depressive symptoms among older adults in Mexico. Again, these studies did not examine this relationship longitudinally, and it is therefore difficult to tease out the temporal order of any links between income inequality and depression

which is necessary for causal inference.

In Africa, studies examining the association between mental health and income inequality are sparse (Burns and Esterhuizen, 2008; Cifuentes et al., 2008; Rai et al., 2013), although many African countries are among the nations with the highest levels of inequality worldwide (Kim et al., 2008). The middle-income country of South Africa consistently tops the list of most unequal societies. The World Bank estimates its Gini coefficient at 0.63 as of 2011, ranking it as the most unequal country among those with available data for that year (World Bank, 2016). This high level of inequality reflects a legacy of colonialism and apartheid, but there is also evidence that income inequality has further increased in the post-apartheid era and in recent years (Bhorat et al., 2009; Leibbrandt et al., 2012; OECD, 2013; van der Berg, 2011). Thus, South Africa may be an important setting in which to examine the potential effects of income inequality on mental health.

Over 16% of South African adults are estimated to suffer from a common mental disorder, including depression, anxiety, or a substance use disorder (Lund et al., 2010; Williams et al., 2008), and estimates of the prevalence of major depression among adults range from about 3% for past year prevalence to nearly 10% for lifetime prevalence (Rai et al., 2013; Tomlinson et al., 2009; Williams et al., 2008). When looking at depressive symptomatology and not solely clinical depression, the estimated prevalence of depressive symptomatology is around 36% for women and 27% for men in South Africa (Ardington and Case, 2009; Tomlinson et al., 2009), illustrating a potentially high burden in this population.

In the present study, we sought to examine the potential association between area-level income inequality and individual-level depressive symptoms in South Africa using longitudinal data. We hypothesized that increases in district income inequality would be associated with increased depressive symptoms. Our study is unique in that it links detailed longitudinal microdata to area-level (district) changes in income inequality over a four-year period. We employ a fixed-effects approach that controls for unmeasured confounding and introduce a wide set of controls for individual and district characteristics. Although South Africa has some of the highest levels of income inequality worldwide (OECD, 2013), few studies have examined the relationship between income inequality and depressive symptoms here. This study contributes to the literature on income inequality and health by expanding our knowledge about the potential nature of this association in a highly unequal setting.

2. Methods

2.1. Data sources and sample

The source of individual- and household-level data for this study was the National Income Dynamics Study (NIDS), which is a nationally-representative, household, panel survey conducted by the Southern Africa Labour and Development Research Unit (National Income Dynamics Study, 2014). The sampling strategy was a stratified, two-stage cluster design, and the household response rate was 69% as described in detail previously (De Villiers et al., 2014; Southern Africa Labour and Development Research Unit, 2014a, 2014b, 2014c).

At the area level, district councils were used as the unit of analysis. South Africa is divided administratively into nine provinces, over 50 district councils, and further into municipalities. District councils are primarily responsible for the delivery of primary health care among other public services and vary widely in terms of characteristics such as demographics, urban-rural make-up, health indicators, et cetera (Day et al., 2012; The Local Government System in South Africa, 2009; Massyn et al., 2014; Naledi

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