Integrating Areal Perspective in the Appraisal of Risk Factors of Non-communicable Diseases in South Africa.

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The World Health Organization (WHO) initiated a plan of action aimed at globally reducing mortality from non-communicable diseases (NCDs) such as cardiovascular disease, cancer, diabetes and chronic respiratory diseases by 25% before 2025 (WHO 2013). These non-communicable diseases (NCDs) remain the leading cause of the world's disease burden (Murray et al 2012; Wagner and Brath, 2012) with about 80% of mortality from these NCDs occurring in low- and middle-income countries (LMICs) (WHO 2011). Evidence also shows that the burden of NCDs has increased over the past 15 years, resulting in an estimated 37% of all-cause mortality and 16% of disability adjusted life years (Maimela, et al 2016).

Specifically, South Africa currently grapple with "quadruple" burden of disease which are high level of HIV/AIDS, infectious diseases such as tuberculosis, high level of mortality and morbidity due to injuries and high levels of non-communicable disease (NCDs). Specifically, non-communicable diseases accounted for 43% of total deaths in all ages and sexes in South Africa in 2012 while the probability of dying between the ages 30-70 years due to NCD was 27% (WHO 2014). The increased prevalence of NCDs in South Africa have been attributed to four lifestyle risk factors of poor diet, physical inactivity, tobacco use and inappropriate use of alcohol (Puoane et al 2008). Urbanization has also been identified as a risk factor in NCD epidemic, due to the fact that people migrate to urban areas as economies develop and thus leads to changes in their lifestyle, which makes them vulnerable to NCDS (Puoane et al, 2008).

Furthermore, it has been noted that understanding the risk factors for noncommunicable disease (NCD) is important for developing and implementing effective preventative strategies (Oyebode et al 2015). However, there remains a dearth of nationally representative area analysis of the prevalence and risk factors of NCDs in South Africa. Thus, the aim of this study is to carry out a rural-urban appraisal of the prevalence and risk factors of NCDs in South Africa. An insight into the areal prevalence and risk factors of non-communicable diseases in South Africa is crucial for location-specific effective advocacy and action. Therefore, the findings of this study will be germane in planning, implementation, monitoring and evaluation of strategies aimed at mitigating and managing prevalence of NCDs in different areas of the country.

Methods

This study used data from the 2014 National Income Dynamics Study (NIDS) survey of households and individuals aged 15 years and above living in the nine provinces of South Africa. A composite index of NCD prevalence was created from five variables of NCD - diabetes, high blood pressure, stroke, asthma, and cancer based on responses from the respondents at the time of the survey. The questions asked in the NIDS were "Have you ever been told by a doctor, nurse or health care professional that you have stroke, diabetes, high blood pressure, cancer, asthma? The responses provided for each of the five diseases were Yes/No. Based on the responses, these five variables of NCD was re-categorized as the outcome variable (NCD) used in the paper. Respondents who reported having any or all of the five diseases were categorized as having non-communicable disease. The outcome variable for the study was a binary variable of "Non-communicable disease (NCD)" and "No non-communicable disease (No NCD)". Covariates used in the analysis included age group, sex, race/population group, education,

marital status, income, housing type and employment status, services, physical activity, smoking, and drinking.

Before analysis, the data was weighted to account for differences due to under-sampling and over sampling errors. The analyses of data were disaggregated on the basis of rural-urban differentials. Univariate analysis used to describe the characteristics of the study population while the identification of statistically significant hot and cold spots of prevalence of NCDs across the study area was carried out using Getis-Ord Gi Hot Spot analysis. Furthermore, the Global Moran's I statistic was used to assess if areas with similar prevalence of NCDs were significantly clustered or spatially correlate while Geographically weighted regression was used to estimate the spatially varying effects of the risk factors of NCDs across provinces and districts. Finally, binary logistic regression was used to estimate rural-urban differences in the risk factors of NCDs in the country. Analyses were done with ArcGIS and STATA softwares.

Results

The findings show that out of 14% of the total sampled population who reported having NCDs, 57% and 43% of them lived in urban and rural areas respectively. In addition, differences in the prevalence of NCDs existed between provinces in rural and urban areas. Figure 1 shows the prevalence of NCDs across Provinces in rural areas while Figure 2 shows the Hotspot results of NCDs across the Districts in urban areas. For instance, Kwazulu Natal province had very high prevalence of NCDs while Northern Cape, Free State, and Guateng provinces had very low prevalence of NCDs. Across the Districts, hot spots of NCDs were found among provinces in Guateng province while most of the Districts in Northern Cape, Northern Cape, Estern Cape, and Free State were associated with cold spots of NCDs. In addition, the Moran's Index of spatial autocorrelation for the urban Districts was 0.263507 with a z-score of 3.928932 and a p-value of 0.000085.

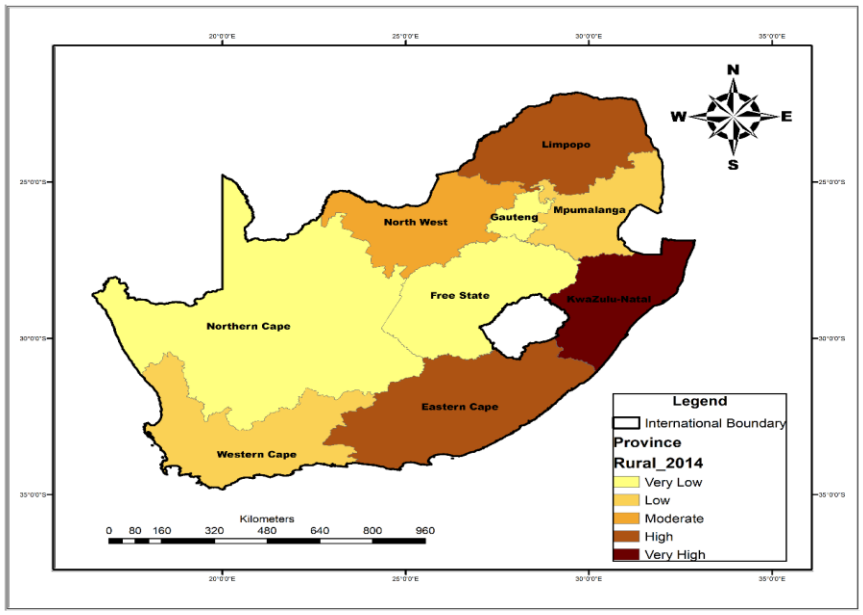

Figure 1: Prevalence of NCDs in Rural Areas Across the Provinces

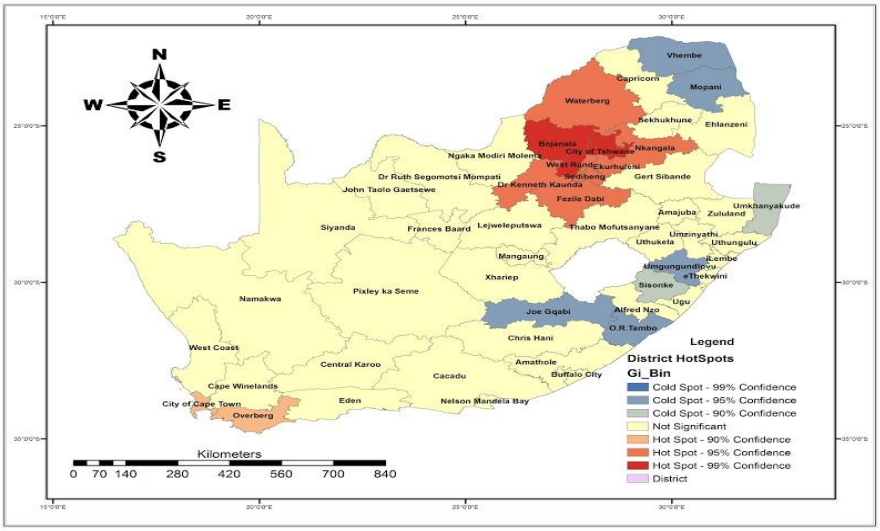

Figure 2: Hotspot results of NCDs in Urban Areas across the Districts

In addition, the results of the geographically weighted regression (GWR) across the provinces and the Districts are shown in Figures 3 and 4 respectively, with reference to the rural areas. Across the provinces, the prevalence of NCDs was higher in urban areas compared to the rural areas. While Western Cape had highest coefficient of the prevalence of NCDs, the lowest coefficient of NCDs was manifest in Guateng, Free State, and Eastern Cape provinces.

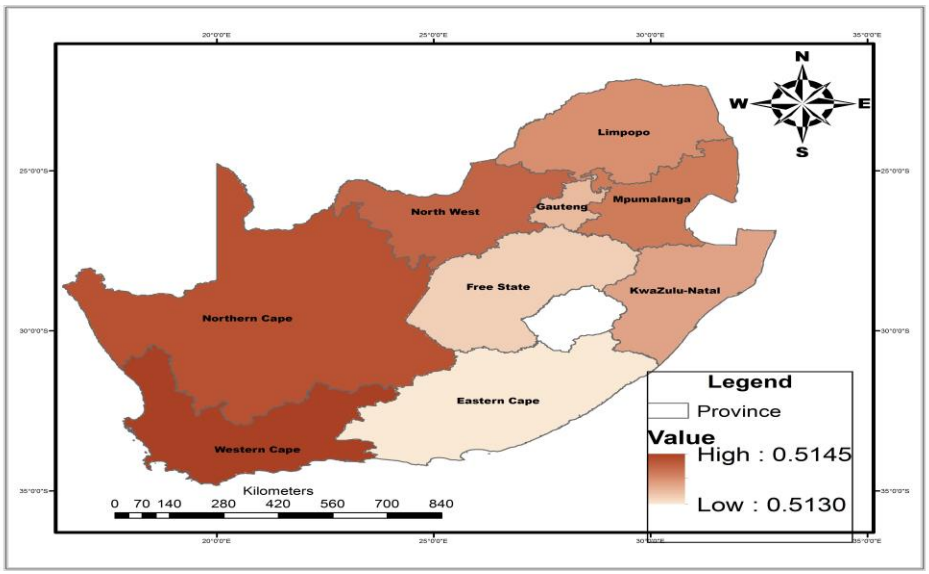

Figure 3: Geographically weighted regression results across provinces(rural area as reference category)

The geographically weighted regression results for the Districts also showed that the prevalence of NCDs was higher in the urban areas compared to the rural areas, even though the coefficients vary across different provinces. Finally the binary logistic regession results revealed that while the females, those aged 25+ years, the married, and divorced/seperated were generally associated with increased odds of NCDs, an increase in educational attainment was generally associated with decreased odds of NCDs. Furthermore, alcohol consumption, and reduced physical exercise insignificantly increased odds of NCDs

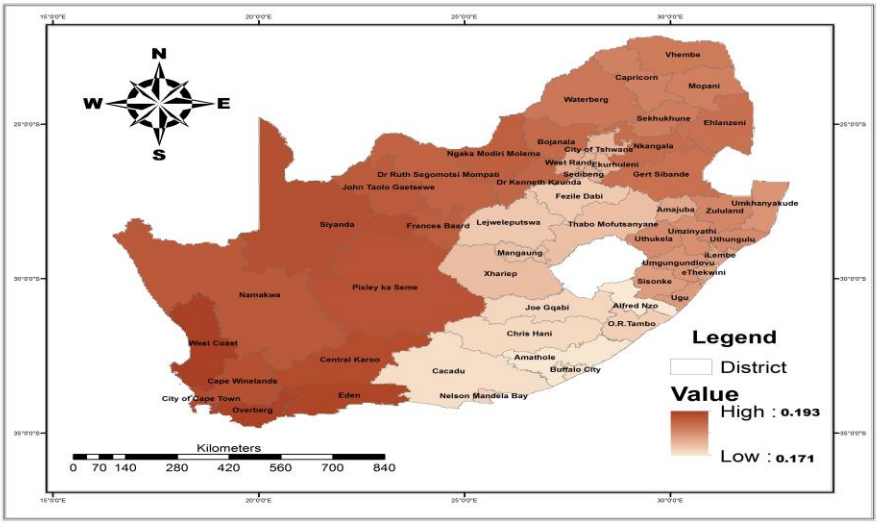

Figure 4: Geographically weighted regression results across Districts (rural area as reference category)

Conclusion

The prevalence and spatial clustering of NCDs significantly varied across provinces and districts with regards to rural/urban place of residence. In addition, the risk factors also varied across rural and urban areas. Given the need to meet the SDG 3 on good health and well-being in South Africa, there is need to:

- increase awareness/sensitization activities targeted more at the females, those aged 25+ years and people with higher education on the risk factors (including behavioral risk factors) of NCDs; and

- strengthen policies and programmes aimed at providing easy access to healthcare especially in the rural and urban areas with high prevalence and clustering of NCDs.

Selected References

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