ABSTRACT

Risk Factors associated with diabetes in South African people aged 15 years and older for the period 2011-2012.

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Introduction: Diabetes is a major public health problem, with the prevalence increasing globally despite being a preventable disease. According to the International Diabetes Federation (IDF), diabetes is a chronic disease that occurs when the body cannot produce enough insulin or cannot use insulin effectively (IDF, 2015). Globally, 442 million people were living with diabetes in 2014 compared to an estimate of 108 million in 1990 (WHO, 2018). In 2019 the IDF estimate was 463 million people. The IDF projected that by 2045 there are expected to be 700 million people having diabetes globally. In 2015, approximately 1.6 million deaths were directly attributable to diabetes (WHO, 2018).

In South Africa, 4.6 million South Africans aged 21-79 years were living with diabetes in 2019. According to the mortality report of Statistics South Africa (StatsSA, 2016), in 2016 tuberculosis and diabetes were the top two causes of mortality in South Africa, with diabetes contributing 5.5% of the deaths. In 2014 diabetes ranked third highest cause of death, contributing 5.1%. In 2016 tuberculosis was the highest cause of death in males, while diabetes was the highest cause of death in females, causing 7.2% of female deaths. StatsSA found that the prevalence of tuberculosis is higher amongst persons with diabetes (StatsSA, 2016).

Objective: The objective of the study was to assess the risk factors associated with diabetes in South Africa among all adults (those aged 15 years and above) from the SANHANES 2011-2012 survey.

Methods: In this study, the SANHANES-1 is used to analyse the risk factors associated with diabetes. SANHANES-1 was a cross-sectional household national survey for the nutrition examination of people living in nine provinces of South Africa collected by the Human Science Research Council (HSRC) (Shisana et al., 2013). The data were collected using a stratified multi-stage disproportionate cluster sample design, with enumerator areas serving as the

clusters. The current study was a secondary data analysis from SANHANES-1 survey for the people living in nine provinces of South Africa (Shisana et al., 2013).

Descriptive statistics such as frequency and weighted percentages were used for analysis. The Rao-Scott adjustment to the chi-squared test was used to test for associations between exposures of interest and diabetes. Weighted bivariate survey logistic regression was used and variables statistically significant at $p< 0.2$ were included in the multivariable weighted logistic regression.

Factors associated with diabetes were determined by fitting survey weighted logistic regression models both including and excluding the effect of BMI, since BMI was only measured on a subset of participants.

Results: The sample size for the cross-sectional study was 15 069 with BMI measured for a sample of 6410. The study found the prevalence of diabetes in South Africa was 5.3%. The prevalence of hypertension was 20.5% for the current study. Two provinces with the highest prevalence of diabetes were KwaZulu Natal 7.5% followed by Northern Cape with 6.5%. The prevalence of diabetes was higher in females (6.3%) than in males (4.1%). Prevelence of diabetes by age category showed age 55 to 64 had the highest with 16.8% with age 65+ at 16.2%.

All models found age (aOR 1.04, (P<0.0001 , 95% CI 1.03; 1.05), family history of diabetes (aOR=4.09, P<0.0001, 95% CI 2.84; 5.91) and hypertension (aOR=4.10, P<0.0001, 95% CI 2.69; 6.25) significantly associated with the presence of diabetes. Almost all models found a significant race effect, with Indians at a greater risk of diabetes compared to Africans.

Geotype (type of geographical location) was found significant only in the Generalised linear latent and mixed models (gllamm) model which included data on BMI. Those that were living in urban informal were found to be 32% lower risk of being diabetic compared to those living in urban formal.

Alcohol intake was found significant in some models. There was a significant interaction between alcohol intake and BMI. Controlling for BMI was found to slightly increase the odds of diabetes for those that drink monthly. The effect of BMI (aOR=1.20, P<0.0001 , 95% CI 1.09;1.29) was found significant in some models. Employed status was not found significant in any of the models.

Conclusion: In this study, the risk factors associated with diabetes mellitus include socio-demographic, lifestyle and co-morbidity factors. The findings suggested that age, race, alcohol intake, hypertension and family history of diabetes were statistically significant risk factors associated with diabetes mellitus. Significant interactions were found between alcohol and race, alcohol and hypertension for models (B, C, D and E), race and age, alcohol and BMI.