Diet and Exercise Intervention and Bio–Atherogenic Markers for Obesity Classes of Black South Africans with Type 2 Diabetes Mellitus Using Discriminant Analysis

Authors : Oladele V. Adeniyi, B. Longo-Mbenza, Daniel T. Goon

Abstract : Background: Lipids are often low or in the normal ranges and controversial in the atherogenesis among Black Africans. The effect of the severity of obesity on some traditional and novel cardiovascular disease risk factors is unclear before and after a diet and exercise maintenance programme among obese black South Africans with type 2 diabetes mellitus (T2DM). Therefore, this study aimed to identify the risk factors to discriminate obesity classes among patients with T2DM before and after a diet and exercise programme. Methods: This interventional cohort of Black South Africans with T2DM was followed by a very – low calorie diet and exercise programme in Mthatha, between August and November 2013. Gender, age, and the levels of body mass index (BMI), blood pressure, monthly income, daily frequency of meals, blood random plasma glucose (RPG), serum creatinine, total cholesterol (TC), triglycerides (TG), LDL –C, HDL – C, Non-HDL, ratios of TC/HDL, TG/HDL, and LDL/HDL were recorded. Univariate analysis (ANOVA) and multivariate discriminant analysis were performed to separate obesity classes: normal weight (BMI = 18.5 – 24.9 kg/m2), overweight (BMI = 25 – 29.9 kg/m2), obesity Class 1 (BMI = 30 – 34.9 kg/m2), obesity Class 2 (BMI = 35 – 39.9 kg/m2), and obesity Class 3 (BMI ≥ 40 kg/m2). Results: At the baseline (1st Month September), all 327 patients were overweight/obese: 19.6% overweight, 42.8% obese class 1, 22.3% obese class 2, and 15.3% obese class 3. In discriminant analysis, only systolic blood pressure (SBP with positive association) and LDL/HDL ratio (negative association) significantly separated increasing obesity classes. At the post – evaluation (3rd Month November), out of all 327 patients, 19.9%, 19.3%, 37.6%, 15%, and 8.3% had normal weight, overweight, obesity class 1, obesity class 2, and obesity class 3, respectively. There was a significant negative association between serum creatinine and increase in BMI. In discriminant analysis, only age (positive association), SBP (U – shaped relationship), monthly income (inverted U – shaped association), daily frequency of meals (positive association), and LDL/HDL ratio (positive association) classified significantly increasing obesity classes. Conclusion: There is an epidemic of diabesity (Obesity + T2DM) in this Black South Africans with some weight loss. Further studies are needed to understand positive or negative linear correlations and paradoxical curvilinear correlations between these markers and increase in BMI among black South African T2DM patients.

Keywords : atherogenic dyslipidaemia, dietary interventions, obesity, south africans