A MATHEMATICAL MODEL TO EVALUATE THE RISK OF CARDIOVASCULAR DISEASE IN DIABETIC POPULATION

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ABSTRACT

Cardiovascular disease (CVD) is a major cause of deaths in both developed and developing countries. This is due to significant increase in the intake of high-energy foods, reduced physical activity, and an increase in stress levels, which in turn lead to dysglycemia, hypertension, and dyslipidemia. The incidence of CVD in diabetics is very high which is aggravated by co-morbidities such as hyperlipidemia and hypertension [1-3]. The aim of this study is to mathematically model the dynamics of CVD in diabetic population with hyperlipidemia and hypertension. Here, the dynamics of the disease is modelled by a system of ordinary differential equations (ODEs). The steady states of the model are computed and their stability is studied. Numerical simulations are performed on the model, and conditions for controlling CVD in diabetics are derived [4,5]. The results of this analysis suggest that the extent of control of hyperlipidemia and hypertension directly correlates with decrease in CVD development in the diabetic population. Early diagnosis of the modifiable risk factors such as hyperlipidemia and hypertension, followed by effective clinical management to regulate blood lipid levels and blood pressure in diabetics would greatly reduce the burden of cardiovascular complications in diabetic populations.

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