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Prediction of Prevalence of type 2 Diabetes in Rwanda using the Metropolis-Hasting Sampling

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The most common known Non-communicable diseases (NCDs) are cardiovascular disease, cancer, diabetes and chronic respiratory diseases. World Health Organization had reported that 63% of total deaths, were due to NCDs, where diabetes count 3.5% and (2%) in 2008 and 2010 respectively. Non-communicable diseases account for 36 percent of deaths in Rwanda, of which diabetes accounts 2%, in 2013. Researchers have worked on this problem using several approaches but in Rwanda the models to predict the future dynamics of diabetes do not exist yet. In this work, we predict the prevalence of type 2 diabetes among adult people. Metropolis-Hasting method was used to calculate the metropolis ratio. Data reported by World Health Organization in 2015 was used. Considering Suffering from diabetes, Overweight, Obesity, Dead and other subject as states of mathematical model, the transition matrix whose elements are probabilities is generated using Metropolis-Hasting sampling. The numerical results show that the prevalence of type 2 diabetes increases from 2.8% in 2015, 12.65% in 2020 to 22.59% in 2025. Therefore, this indicates the urgent need of prevention by Rwandan health decision makers who have to play their crucial role in encouraging physical activity, regular checkups and sensitization of the masses.

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