Abstract

The population size of every country or government is very important in planning on effective service delivery. The cost of conducting population census yearly is of great significance to the country's budget and many countries conduct population census once in a decade. This makes planning and provision of services to be based on mere approximation. Provision of free maternity services, estimation of national hospital insurance fund premium for medical care, and provision of retirement benefits, payment of allowances to the aged require accurate demographic statistics. In this study, population dynamics is described using a stochastic model, where population is put into distinct and disjoint age classes: Juvenile, sub-Adult, Adult, Resting-Adult, Senior Citizens and the Aged. These structures are assigned intra and inter group transmission rates which form the elements of transmission matrix and presented in form of a Leslie model. The model was modified to allow stochastic variation of transition parameters which is affected by demographic and environmental factors, specifically the effect of contraceptives to control population. It was found that intermittent implementation of control strategy at 50% and 70% efficacy yields a steady population growth rate of λ=1.39 and a steady population distribution of P=(23%, 10%, 23%, 18%, 23%, 20%, 6%)^T.