International J. of Math. Sci. & Engg. Appls. (IJMSEA)
ISSN 0973-9424, Vol. 6 No. IV (July, 2012), pp. 77-90

FUZZY MATHEMATICAL MODELLING ON THE CONTROL OF HYPERTROPHIC OBESITY AND HYPERPLASTIC OBESITY

B. ARUNRAJ

Department of Mathematics,
A.V.V.M.Sri Pushpam College (Autonomous),
Poondi 613 503, Thanjavur (DT), Tamil Nadu, India

Abstract

In this paper, a model is proposed for the control of hypertrophic obesity and hyperplastic obesity, using fuzzy mathematical modelling. The transient behaviour of the diffusion model is in the form of deterministic approach involving partial differential equation of parabolic type. Mathematical modelling analysis is performed using the mathematical model under the influence of the given body mass index (BMI) value, treatment levels, degree of obesity and time. The uncertainties associated with the given data such as BMI diffusivity and BMI acceleration could not be accounted due to non-availability of relevant parameters. Hence, the uncertainties are modelled by fuzzy parameter. In order to predict the system behaviour in a reliable manner, the partial models of the uncertainties are integrated with the mathematical modelling. In this paper, the new procedure is adopted which is known as fuzzy mathematical modelling. We apply Fourier's law to express the equation of obesity, which is known as diffusion equation. The effects of treatment process over the obesity and the natural process of obesity with no treatment are determined with the use of fuzzy rule based system. The result indicates that the control of the obesity depends on both the degree of obesity with its induction level and on appropriate treatment levels. The calculated solution is compatible with the behaviour of obesity under treatment and no treatment, as reported in the medical literature.

Key Words : *Body mass index, Diffusion equation, Fourier's law, Fuzzy logic.*