OPTIMAL CONTROL MODEL FOR POOR NUTRITION IN LIFE CYCLE

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Abstract. In this paper, a transmission model of poor nutrition in life cycle has been formulated as a system of non-linear ordinary differential equations to study the spread of poor nutrition at different stages of life from a malnutrited pregnant female. Here, the basic reproduction number is calculated at an endemic equilibrium point which decides the existence of poor nutrition in the society. The analysis of local stability and global stability has been carried out. To keep the society healthy, malnutrited pregnant female are advised for healthy nutrients which is considered to be the control. Numerical simulation has been done to support this model.

Keywords. System of non-linear ordinary differential equation, Poor nutrited life cycle, Basic Reproduction number, Control

1   Introduction

From conception through pregnancy, birth, childhood, adolescent and older age, nutrition plays a vital role in every stage which supports health and wellness, improving the quality of life. Once the effect of poor nutrition begins in the womb, it continues well into childhood, adulthood and cycle across generations, whereas malnutrition consists of generations of children in a cycle of poverty, better nutrition and particularly in the stage of infancy which is the building block for future growth and development. Nutrition gain or loss during the period of infancy will survive in the child for a life time. The period of pregnancy is a special time in every woman's life. Healthy eating will definitely increase the chance of having healthy baby.

Improper lifestyle and poor nutrition of a pregnant woman leads to a low weight baby. A baby whose birth weight is less than 2.5 kilograms is considered to have low birth weight. Low birth weight indicates the risk of infant