Weighted Goal Programming Approach for Solving Budgetary Radiation Therapy Treatment

Wednesday, 17 February 2021 11:55 (6 minutes)

I.INTRODUCTION

In today's fast paced and competitive era of healthcare service provision, optimal allocation of budgeted expenditure poses a critical concern among patients under radiation therapy treatment. In this study, a goal programming model was developed to allocate budgetary expenditure for radiation therapy of inpatients at a medical facility. The relevant components of budgetary expenditure considered included drugs/materials, labor and miscellaneous costs. In order to test the proposed model, data for budgetary expenditure was obtained on a monthly basis at Mulago Cancer Institute in Uganda. The study primarily examined cost requirements for two categories of patients. Category 1 patients showed symptoms of initial stages when cancer had just spread to nearby tissues of the body. Category 2 patients had the spread of cancer to several parts of the body.

2. METHODOLOGY

A weighted goal programming model is developed and initially, the objective function is defined. The model seeks to minimize the deviation variables of the objective function.; subject to the goal values of budgetary expenditure allocated for treating category 1 and category 2 patients. The sum of weighted deviations is minimized so that actual expenditure on drugs/materials, labor and miscellaneous costs meets the projected expenditure. Resource leveling is achieved by using the simplex method for linear goal programming; that requires solving the standard minimization problem. A numerical example is presented for illustration; that determines the optimal allocation of expenditure on drugs/materials, labor and miscellaneous costs for inpatients under radiation therapy treatment.

3. RESULTS

Results from the numerical example presented indicate that certain goals on drugs/materials, labor and miscellaneous costs can be fully or partially achieved. This however depends upon the priority levels and targets set for budgeted expenditure; in line with the two categories of patients under treatment. The application of this solution approach allows hospitals to identify satisfactory allocation of expenditure; based on the priority levels or goals set for meeting budgetary projected costs during radiation therapy treatment among patients.

4. CONCLUSION

The weighted goal programming approach for inpatient radiation therapy can be effective; where relevant cost categories can be prioritized if necessary. This ensures cost-effective medical treatment in hospitals; a core ingredient of sustainable healthcare service provision.

Country or Int. Organization

UGANDA

Affiliation

KYAMBOGO UNIVERSITY

Primary authors: MUBIRU, Kizito (Kyamboto University); SENFUKA, Christopher (Kabaale University); SEMPIJJA, Maureen (Kyambogo University)

Presenter: MUBIRU, Kizito (Kyamboto University)

Session Classification: Paper Session 3: Health Economics and Health Systems Research