

Simulation Modelling of ‘PHN (public health nurse) – Dyad (a pair of new born baby and mother)’ Postpartum Home Visiting System

Chowdury Md. Luthfur Rahman

Graduate student, Mechanical and Manufacturing Engineering Department
University of Calgary, Calgary, AB, Canada, T2N 1N4

Paul Rogers and S.T. Enns

Associate Professor, Mechanical and Manufacturing Engineering Department
University of Calgary, Calgary, AB, Canada, T2N 1N4

Abstract

This simulation modelling project paper describes the design and development procedure of a simulation model of a specific service system's problem – postpartum (after birth) care. The model is an Arena simulation model of a day in the life of the PHN (public health nurse) - Dyad (a pair of new born baby and mother) postpartum home visiting system. The developed model will assist in understanding the postpartum home visiting system and will provide an animation of the system's operation in practice as well as it will evaluate the system performance under different circumstances. Everyday a set of new dyads of different categories is generated using the characteristics in the data base. The dyads generated need to get visited by the public health nurses (PHN) of various classes, the only defined resources in the system required to visit the dyads. The visits of PHNs will be carried out on the basis of unvisited dyads created each day as well as taking into consideration some of the previously generated dyads that have been deferred from earlier days as they could not be seen within the specified time frame. In this connection, this simulation modelling will be focused on the problem of analyzing the assignment of PHNs to the corresponding dyads on a daily basis which need to get accomplished as per the scheduling defined. The most important performance measures of interest illustrating the system's behavior include, among others, the percentage of dyads visited within the recommended time frame, the percentage of tardy visits, the average tardiness over all visits, and the average daily overtime expected for each nurse. The output reports in the form of performance measures generated from various simulation runs will be exploited to test alternative assignment procedures of public health nurses to the corresponding dyads necessary to attain optimal performance from the system and to examine how the system performance would be varied with changes to key input parameters or under different external conditions.

Keywords

Simulation modelling, public health nurse, dyad, postpartum care, assignment problem.