Queueing analysis of patients flow and optimal bed requirement of maternity ward in Matara hospital

Nivarthana H.P.K. and Jayasekara L.A.L.W.*

Department of Mathematics, University of Ruhuna, Matara, Sri Lanka

The General hospital Matara is a major healthcare service provider in Matara district. There is some patients' traffic in wards and some patients wait for days until they get a bed. Among these wards in the hospital maternity ward is always riddled with delays. This problem can be managed by using queueing model to determine the waiting line performance such as: arrival rate of expectant women, average service rate of expectant women and system utilization factor in the system.

This research surveys the contributions and applications of Queueing theory in the field of healthcare, examines data from maternity ward in Matara general hospital and uses Queueing analysis to estimate bed unavailability in maternity ward. The data were obtained for all patients in maternity ward over one-month period from July 01, 2016 to July 30, 2016. Queueing system is based on Single-Queue Multiple-Server model. Since arrivals follow a Poisson distribution, service time follows an exponential distribution and patients are served on first come first serve basis, M/M/s queuing model is used to find the optimal bed count. Results of the M/M/s queueing model were used to find the optimal bed requirement of the maternity ward.

Keywords: Queueing model, System utilization factor, arrival rate, service rate, M/M/s.

Corresponding Author: leslie@maths.ruh.ac.lk