## A Model to Reduce Unnecessary Waiting Times in the Outpatient Department

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W. M. N. B. Weerakoon<sup>1(\*)</sup>, S. Vasanthapriyan<sup>1</sup>, U. A. P. Ishanka<sup>1</sup>

<sup>1</sup>Department of Computing & Information Systems, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka

(\*) <u>Email</u>: wmnbweerakoon@std.appsc.sab.ac.lk

Most public healthcare centers face the issue of handling patient queues in outpatient departments (OPDs) and this leads to overcrowding of patients. Waiting in queues unnecessarily increases the suffering of patients with their disease but also waste of precious time. Increasing the number of staff members may not always be a good solution to solve this problem because the increasing number of staff can cost more than patients' total waiting costs. This research used queuing theory analysis to discover present mean waiting time for patients and predict waiting times by increasing servers in OPD. Finally, a new system was suggested to decrease mean waiting times in OPD. The two fundamental parameters of queuing theory analysis are arrival rate ( $\lambda$ ) and service rate ( $\mu$ ). The arrival times and service times of each patient were gathered directly for each service point (registration, consultation and pharmacy) over a week. During the calculation of service rates, tea breaks and lunchtime were excluded. The present queue system adapts the ideas of the Tandem queue system and the queue discipline which has been used was first come first serve discipline.A new OPD system is suggested after queuing analysis and then the mean waiting time in the system can be reduced to rate of 65.69% - 74.90%. Furthermore, this rate was achieved through a theoretical study and a simulated system has been proposed to be implemented to decrease waiting times in OPD queues at hospital for patient management.

Keywords: Queuing theory, patients management system, tandem queues

