

**AN EMPIRICAL ANALYSIS OF QUEUING PRACTICES IN
RELATION TO PATIENT SATISFACTION AT THE
OUTPATIENT DEPARTMENT OF TEACHING HOSPITAL
KALUTARA**

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179052V

Degree of Master of Business Statistics

Department of Mathematics

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**Dissertation submitted in partial fulfillment of the requirements for the
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Declaration of the candidate

I declare this is my original work and does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any other University or Institute of Higher Learning. To the best of my knowledge and belief, it does not contain any material previously published or written by another author except where the acknowledgment is made in the text.

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Statement of the supervisor

I hereby certify that the above candidate has carried out this research for the master's dissertation under my supervision.

Name of the supervisor

Signature

Date

DEDICATION

To all my teachers in STATISTICS

ACKNOWLEDGMENT

I am indeed delighted that I have reached another pinnacle in my academic career. Having obtained a base degree in a non-mathematical field, pursuing a mathematical graduate qualification was certainly a challenging task. In fact, it would have not been possible unless the generous support and guidance that I always received from my teachers. Hence, I am sincerely grateful to all those wonderful people in the Department of Mathematics, University of Moratuwa for pushing me toward this esteemed achievement in my academia.

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ABSTRACT

A waiting line or a queue is a common phenomenon, particularly where the demand for a service exceeds its supply. However, an operations research technique commonly known as queuing theory is now widely used in many applications of optimizing operations that deal with this mismatch. Waiting, which is known to cause patient dissatisfaction is a common occurrence in public healthcare settings. However, it is not only the waiting that brings dissatisfaction to the patients but also the other factors such as quality of care, consultation time, rapport with physicians, and physical environment of the settings, etc. A descriptive cross-sectional and analytical study was designed and carried out at the outpatient department of Teaching Hospital Kalutara, with data collected primarily through an interviewer-administered questionnaire and an observation chart over a two-week period. This study attempted to describe the level of satisfaction of patients in terms of their socio-demographic characteristics, frequency of visiting, perceived waiting for service, perceived speed of service, and perceived serving time. The associations between socio-demography, perceived waiting, and satisfaction were found significant. However, the associations between the perceived speed of service, perceived serving time, and the level of satisfaction were not significant. Having identified the queuing system that complies with exponentially distributed inter-arrival times and serving times in the presence of multiple servers (M/M/c queuing model) as an appropriate model to analyze the queuing system of the outpatient department of Teaching Hospital Kalutara, it was observed that the system has been heavily overutilized. The results of the parameter estimates were challenged by the fact that the arrival rates of the system often exceeded the rate of serving. The simulation results indicated that about twenty-eight physicians are therefore needed to serve during rush hours if the expected standards of care were to be achieved. However, having a large number of serving physicians at once is not an appropriate solution in terms of operational, administrative, and financial feasibility. Therefore, an appointment system to schedule the arrival process, and to deploy an appropriate number of physicians resolute through M/M/c simulation-based modeling, which should essentially carry the standard criterion for service rate, is recommended to achieve better patient satisfaction by optimizing care at the outpatient department of Teaching Hospital Kalutara.

Keywords: Queuing theory, outpatient department, patient satisfaction

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LIST OF ABBREVIATIONS

FCFS	First come first served
LCFS	Last come first served
OPD	Outpatient department
SIP	Served in priority
SIRO	Served in random order
THK	Teaching Hospital Kalutara

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