

PDF - PATIENT CARE SERVICE DELIVERY SYSTEM USING TIMED COLOURED PETRI NETS -  
researchcub.info **ABSTRACT**

In hospitals, patient care service delivery is an important factor that determines the rate of quality service. Most of the existing Patient Care Service Delivery System models reported in literature were majorly to improve service in the emergency department using different performance metrics. However, this research work conceptualized on modelling a patient care service delivery system which is characterized by emergency, inpatient and outpatient cases using Timed Coloured Petri Nets.

In developing a Timed Coloured Petri Nets (TCPN) model for a patient care service delivery system, the medical personnel (nurses) and the three categories of patient (emergency, inpatient and outpatient) visiting the Oyo State General Hospital, Fiditi, were used as a case study. The developed Patient Care Service Delivery System (TCPN) model consists of three sections. The first section modelled the three categories of patients and their current states. The second section modelled the Nursing station and how patients were administered by the available nurse(s), while the third section abstracted the nurse-patient service delivery. The developed TCPN model was simulated using CPN tools. The validation of the developed TCPN model was explored by carrying out the statistical analysis between the simulated and the observed average waiting times and queue length of the patients under study.

The simulation results of the developed TCPN model revealed the patient average waiting times of 14.5208, 2.9583, 0.9792 and 0.50000 minutes alongside the patient queue length of 27, 6, 5 and 1 as administered by 1, 2, 3 and 4 nurses respectively. Statistically, there were no significant difference between the simulated and the observed average waiting times and the queue lengths of patients under consideration at 5% level. Conclusively, this research work has been able to develop a TCPN model for studying a patient care service delivery system. Also, the developed Timed Coloured Petri Nets model, through its simulation, could help in predicting nurse-patient ratio required for effective patient care service delivery in a named medical center.

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