Abstract

Patient well-being is crucial for effective healthcare systems, which face ongoing challenges in resource allocation and satisfaction improvement. This research develops a comprehensive integrated approach to enhance patient satisfaction, focusing on Length of Stay (LOS) and physician assignment, by combining discrete event simulation (DES) modeling, multi-objective optimization (MOO), and decision-making guidelines.

The study investigates the impact of resource allocation strategies, patient flow patterns, and physician assignment on clinic performance and patient satisfaction. Data collection involved surveys, observations, and interviews to understand the hospital environment comprehensively. A unique formula was derived to compute satisfaction scores from survey data, which informed the development of a simulation model. The research applies a weighted max-min fuzzy multi-objective optimization methodology to balance competing objectives. By incorporating priority weights and scenario analysis, this integrated approach enables decision-makers to effectively manage trade-offs between different goals.

A case study of the Ophthalmology department at Thammasat University Hospital (TUH) in Thailand demonstrates the practical application of this integrated approach. The outcomes provide tailored improvement suggestions for hospitals of different sizes. For large hospitals, enhancements positively impact both LOS and physician assignment satisfaction. For medium and small-sized hospitals, two distinct options focusing on either LOS satisfaction or physician assignment satisfaction.

The findings underscore the importance of patient satisfaction as a central objective in healthcare optimization efforts and highlight the potential of advanced modeling techniques in addressing complex healthcare challenges. This research offers an adaptable, comprehensive workflow applicable to other hospital departments, promoting a holistic strategy for healthcare system enhancement. Future research directions include aligning this integrated approach with sustainable development goals to ensure long-term improvements in healthcare quality and accessibility.

Keywords: Patient satisfaction, Resource management, Multi-objective optimization, Simulation, Healthcare