

Quantitative Optimization of Nurses in Emergency Department of Teaching Hospital: A case study

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Abstract

Background: In hospitals, nurses are often the most important part of the human resources, as 62% of the workforce and 36% of hospital costs are related to the nursing staff. Emergency Department (ED) requires an adequate number of nurses due to its crucial role in delivering emergency medical services round the clock. In current study were examined optimization of nurses in ED using Linear Programming (LP) model.

Methods: This study type is practical and using LP Model was conducted in ED in the first quarter of 2014. Research population identified by census and include all patients (3342 persons) admitted to ED and its nurses (84 persons). Number of patients and nurses were gathered from hospital information system and human resources database respectively. To determine the optimum number of nurses in various shifts, after extracting of descriptive statistics, LP model created by literature review and professional consultation, and run in GAMS software.

Results: Before running the model, number of nurses was needed in ED in the morning, evening and in the night (two shifts) shifts were 26, 24 and 34 nurses respectively. After using the model, optimum number of nurses was 62 that were required 17 nurses in the morning shift, 17 nurses in the evening and 28 nurses (two shifts) in the night shift. This number was reduced to 60 nurses using sensitivity analysis.

Conclusion: number of nurses estimated by LP was less than the number of nurses working in the ED. This difference can be reduced by scientific understanding of the factors influencing the allocation and distribution of nurses in the ED, and flexibility organizing of them.

Keywords: Emergency Department, Nurses, Teaching Hospital, Quantitative Optimization, Linear Programming.

Biography

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