

DECISION ANALYSIS IN EMERGENCY DEPARTMENT TO EVALUATE THE OVERALL PERFORMANCE: A METHOD BASED ON AHP AND TOPSIS

ABSTRACT

The aim of this study is to evaluate the overall performance of emergency departments in hospital sector. A hybrid model with AHP and TOPSIS methods has been designed to evaluate the decision making model. AHP has been used to determine the criteria and sub-criteria weights. TOPSIS method ranks three hospitals from Healthcare Sector according to the overall performance of their emergency departments.

Keywords: Healthcare, Emergency, TOPSIS, AHP

1. Introduction

Emergency departments are responsible of providing medical and surgical care to arriving patients with the need of immediate care. However, some errors may occur before, during and after patient care. In this way, it is necessary to measure the performance of different service components that play an important role in patient care to establish focused actions lines. Although specific indicators have been created to evaluate several critical to satisfaction, there is not a model that assesses the overall performance of these departments.

2. Literature Review

In an emergency department, it is necessary to collect many and different types of information to deal with emergency tasks in different phases (De Felice and Petrillo, 2015). A systematic literature review has been carried out to search if a similar study has already been published. For instance, Eskandari *et al.*, (2011) proposed a framework integrating the simulation model of patients flow process with the group AHP and TOPSIS decision models in order to evaluate and rank scenarios based upon desired performance measures. While Abo-Hamad developed a framework combining simulation modeling, balanced scorecard, and multi-criteria decision analysis aiming to provide a decision support system to emergency department managers.

3. Hypotheses/Objectives

Health research is one of priorities in every economy. Healthcare systems in general and Emergency Departments in particular around the world are facing enormous challenges in meeting the increasingly conflicting objectives of providing wide accessibility and efficiency while delivering high quality and prompt services. Thus, according the above

considerations this research aims to assess the overall performance of emergency departments in hospital sector in Colombia.

4. Research Design/Methodology

The present study is based on the integration of the AHP and the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). AHP is perhaps the most well-known and widely used multi-criteria method, while TOPSIS is based on the concept that the chosen alternative should have the shortest geometric distance from the positive ideal solution and the longest geometric distance from the negative ideal solution.

5. Data/Model Analysis

A decision making model with 7 criteria, 23 sub-criteria and 3 alternatives (hospitals), has been designed. The model has been developed with the support of several experts from healthcare sector and studies developed by Ministry of Health and Social Protection. Figure 1 shows the proposed AHP Model.

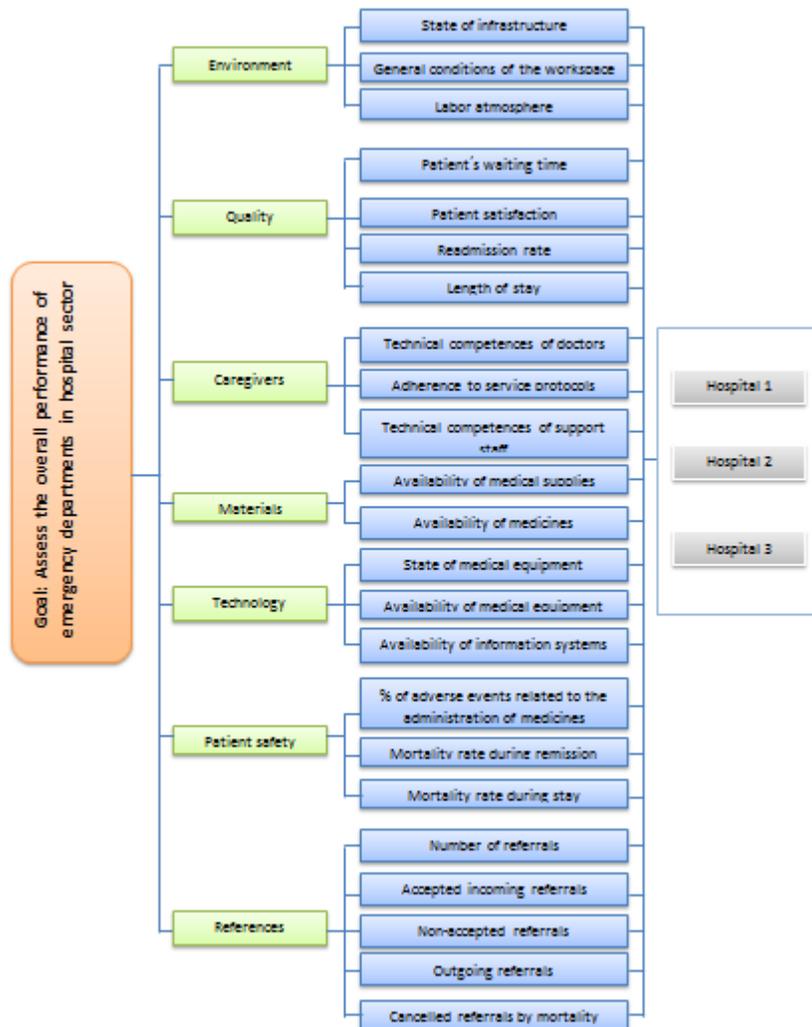


Figure 1: The proposed AHP model

The results underline that the most representative factors upon evaluating the overall performance of Emergency Departments in hospital sector are: PATIENT SAFETY (GW = 25.4%), CAREGIVERS (GW = 19.9%), QUALITY (GW = 15.4%) and REFERRALS (GW = 11.5%). There is not a leading factor. The contributions between factors are similar with a maximum difference of 17.7%. This implies creating multi-criteria strategies to improve the overall performance in hospitals.

6. Limitations

It is important to note that the findings may be related to the characteristics of the analyzed scenario. The study was limited to 3 hospitals in Colombia, which could partially explain the results. Future research will take into account several parameters. Furthermore a comparison with other country will be developed.

7. Conclusions

Assessing the overall performance of emergency departments in hospital sector is a complex task, which considers a large number of rules (often conflicting) related to various aspects. For this reason, it is necessary to use a proper decision making tool to simulate a realistic scenario. To face this challenge, multicriteria decision methods such as AHP and TOPSIS have been used. The proposed hybrid model is useful to prioritize the relative importance among several parameters in order to make the right decision and to define the proper strategy.

8. Key References

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