ABSTRACT

Inventory management is one essential lever to use the resources efficiently. However, managing inventories in hospitals is a challenging task because of the several issues: a high service level of medical supplies is required under the unpredictable demand, medical products constitute a significant portion of the overall costs, and the management of these supplies requires considerable effort to check the levels to track usage and to distribute them. Therefore, it is pertinence to apply operations research tools to cope with the managerial issues of the hospital inventory system. In this chapter, the authors implement an (s, S) inventory model by using simulation in a case study of a hospital in Izmir, Turkey. They aim to analyze the unpredictable nature of demand of medical supplies in this hospital and its implications on the developed inventory policy.

DOI: 10.4018/978-1-5225-7591-7.ch009
INTRODUCTION

Inventory management has been an extensive topic of research in the healthcare sector. The primary goal of inventory management is to reduce the cost of healthcare without decreasing the patient satisfaction. This is because of the fact that high service level for medical supplies and effective inventory management policies are critical for healthcare industries. However, this is highly challenging task for the service providers since while medical supply excess leads economic losses, medical supply deficiency creates significant effect on patients. This highlights the need for efficient inventory management of healthcare systems.

According to World Health Organization and OECD reports, the global health economy is growing more rapidly compared to the overall economy (World Health Organization, 2008; OECD, 2017). Apart from health services, healthcare products are the main contributors to cost of the health sector. Zheng et al. (2006) present that different medical supplies, are distributed and traded in a different way, and differ in their cost, criticality to patient care and potential impact on service improvement. Among healthcare products, medicines account for 20-30% of global health spending (World Health Organization, 2010; OECD, 2017). In the light of this information, appropriate inventory management of medical supplies is directly related to a country’s ability to address public health concerns.

Considerable research has been done on healthcare inventory systems (see, e.g., Beier, 1995; Duclos, 1993; Kelle, Woosley, & Schneider, 2012; Nicholson, Vakharia, & Erenguc, 2004; Priyan & Uthayakumar, 2014; Volland, Fügener, Schoenfelder, & Brunner, 2017). They mainly focused on improving inventory management policies of pharmaceuticals (see, e.g., Ali, 2011; Vila-Parrish & Ivy, 2013) since they play an important role in healthcare sector due to the significant costs of the medical supplies, their storage and control requirements (Priyan & Uthayakumar, 2014). Some other papers consider the problem from supply chain perspective and instead of focusing on one echelon, they study the pharmaceutical supply chain (Kelle et al., 2012; Narayana, Pati, & Vrat, 2014).

In this study, the authors discuss the current practices for inventory management in a training hospital in Izmir, Turkey and the focus is on the pharmacy of the Emergency Department (ED). We perform an extensive analysis for the medical supplies to decrease the number of varieties in inventory management. Then, we suggest using inventory management policy options for these medical supplies in the pharmacy of the emergency department. The objective of the study is to provide valuable insights to the management of the studied hospital on how to decide the reorder and order-up-to levels for each medical supply group.

The chapter is organized as follows: We provide a brief background about inventory management in the next section. Background section starts with the general inventory management discussion and then reviews the importance of inventory management in a hospital and how the research evolved in this area. Then, Research Issues and Problems section investigates the challenges in an emergency department from the inventory management point of view. We present the method we follow to solve the issues in the emergency department in Research Methodology section. Solutions and Recommendation part demonstrates how the techniques are applied to solve the problem and presents the results. Last, we conclude the chapter by our findings, interpretations and future recommendations in Conclusion and Future Research Directions section.