
Identifying Dimensions of hospital cost management in Iran using structural equation modeling

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Abstract

Aim: Hospitals as the most important providers of healthcare services around the world, are facing a wide range of duty and cost of services. This article aimed to identifying the key dimensions affecting in the cost management of Iran hospitals.

Methods: This descriptive study was performed in two qualitative and quantitative stages. First factors influencing hospital cost management were extracted through literature and interview with 20 experts in the field of hospital governance and proposed model was designed. Then a questionnaire was developed and data was collected from 207 experts in the staff-and-line sector of Tehran University of medical sciences. The research model was analyzed using exploratory and confirmatory factor analysis in SPSS22 and Lisrel software.

Results: Five dimensions influencing hospital cost management were identified. Human resource management and consumption resource management with factor of 0.88 and 0.71 had the most and least significant efforts on hospital cost management.

Conclusions: This finding revealed that, for optimal hospital cost management, while considering all five factors, human resource management should be emphasized.

Keywords: Hospital, Cost, management.

Introduction

Over the past decade, the healthcare systems in most countries has a significant increase in cost of services. According to a major World Bank study of public hospitals, the share of public sector health resources in world's countries consumed by hospital ranges from 50 to 80 percent(Velmurugan,2010). In other words, the hospitals of the most countries are an important element of the concern about health cost management because they are the largest and most costly operational unit of these health systems and account for a large portion of the health sectors financial. Such concerns include: the sources of finance for health services, the ability of the public sector to maintain past funding levels, resource allocation patterns in the public sector and the efficiency of health services delivery (Banker,Bardhan,2008).

In Iran, the public sector provides primary, secondary and tertiary health services. The emphasis of the government on primary health care over the last two decades has made the public sector the main provider of primary health care services across the country(Namazi,2009). Iran has increased investment in health during the last ten years. Accordingly, almost all health investment indices have improved during the above-mentioned period; in some cases, the index has tripled(Mosadeghrad,2011). While the overall cost index in Iran has increased 30 times in the last 20 years; this growth in health sector spending has increased 71 times. As different industries have evolved over time, so have cost management methods and the management accounting research analyzing these methods.

Different approaches of cost management have emphasized different components of the methodologies in hospital management(Esfahani,2018). This literature has identified various cost management techniques, such as Traditional costing (TC), activity-based costing (ABC), activity-based management (ABM), time-driven ABC (TABC), target costing, balanced scorecards (BSC) , Performance-Focused Activity Based Costing (PFABC) and ratio of cost-to-charges (RCC). The study will focus on cost management techniques seen primarily in the healthcare environment. Figure 1 presents the findings of literature view since 1995.

Table1. The most important studies of hospital cost management

Methodology	Researcher/s , Year
Traditional Costing (TC)	McKenzie (1999), Paulus et al. (2002)and Velmurugan (2010)
time-driven ABC (TABC)	Namazi (2009), Saffle (2009), Esmalifalak (2015), Cooper et al. (2015), Ostadi et al. (2019), Manrai (2018)
Performance-Focused Activity Based Costing (PFABC)	Namazi (2009), Sarokolaei et al. (2013) and Nouri (2020)
Activity-based costing (ABC)	Swenson (1995), Banker al. (2008), McGowan and Klammer (1997), Kaplan & Cooper (1998), McGowan (1998), Ittner et al. (2003), Kaplan and

	Anderson (2004) Lawson (2005), Turney (2010), Velmurugan (2010), Horngren et al. (2010), Moisello (2012), Gapenski and Reiter (2016) and Watkins (2000)
Ratio of cost to charges (RCC)	Reid and Smith (2000), Gapenski and Reiter (2016).Shwartz and Young (1995) , Kaplan and Porter (2011)

In order to expand previous research, the present study was conducted to identify the dimensions of hospital cost management.

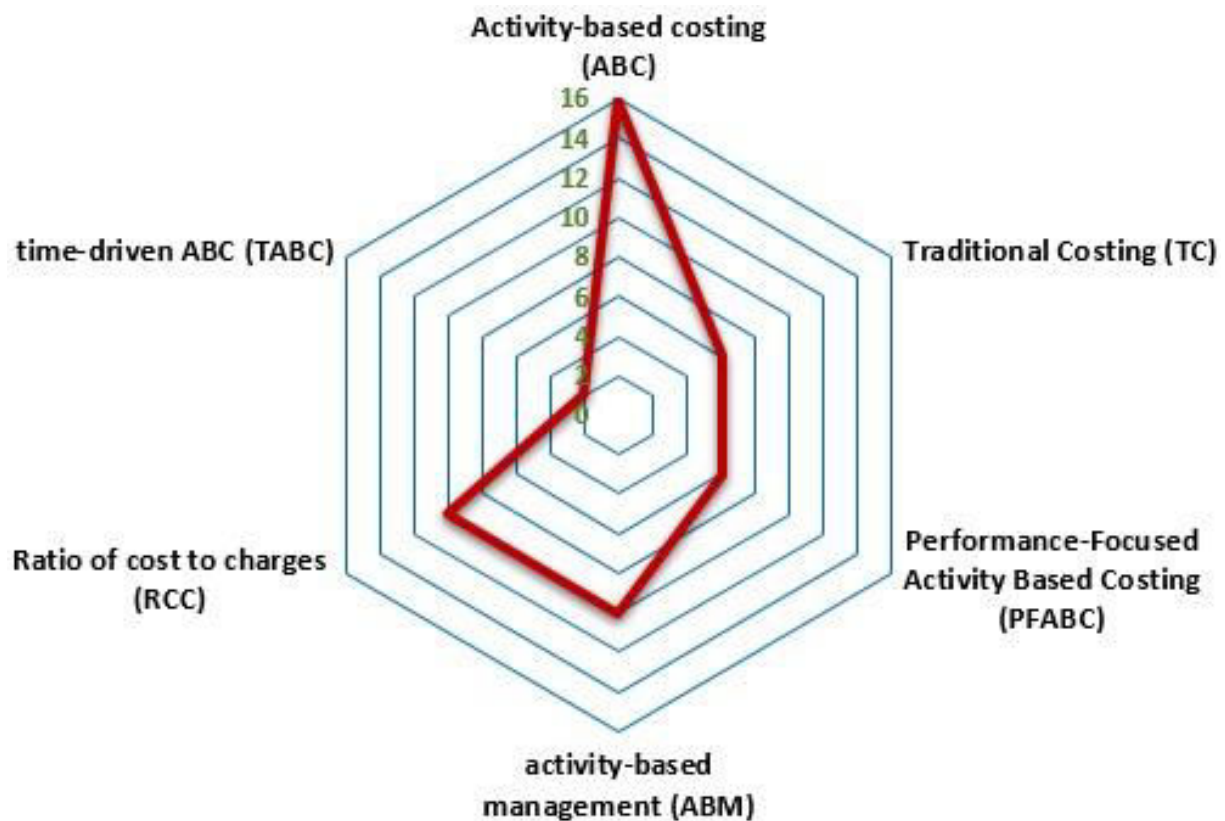


Fig1. Findings of the hospital cost management literature study

Methodology

This descriptive study was carried out in two qualitative and quantitative stages in 2019. In qualitative stage, factors influencing hospital cost management were identified and extracted through literature research and an interview with 20 experts in the field of the hospital management. The inclusion criterion for experts was a minimum experience of 10 years in healthcare or hospital management positions. The interviews continued until reaching data saturation, and analysis of the collected data from the interviews was carried out by content

analysis. Afterward, the data obtained from this stage (literature review and interview) were classified using an information form, and duplicate data were removed.

The most important variables affecting hospital cost management were classified into five groups and the proposed model was designed. In quantitative stage, to confirm the validity of the proposed model by a large number of experts, a researcher-made questionnaire with 40 items, rated on a five-point Likert scale (from very low = 1 to very high = 5), was used. The content validity of the developed questionnaire was evaluated by 20 experts. The coefficients of variation ratio (CVRs) were higher than the critical level (0.79), and therefore, the content validity of the questionnaire was confirmed. In addition, to assess reliability, the questionnaire was distributed among 20 experts, and Cronbach's alpha coefficient was calculated (0.872) using SPSS software, which indicated the high reliability of the questionnaire.

The questionnaire was distributed among 219 samples, including experts of hospital governance in the staff-and-line sector of the ISSO across the country. Finally, a total of 207 questionnaires were collected. Figure 2 presents the research methodology. The sample size was determined using the Cochran formula, and sampling was carried out using purposeful sampling method. The adequacy of the sample size was estimated at 0.856, based on the Kaiser-Meyer-Olkin (KMO) index. The collected data were analyzed in SPSS software. An exploratory factor analysis was used to explore and evaluate the dimensions of the model through a mathematical approach. The internal consistency of dimensions was estimated through Cronbach's alpha. Finally, confirmatory factor analysis was utilized to verify the model, using Lisrel software.

Result

Table 2 presents the Eigen values of factors and the total variance explained by each factor.

Table2. Eigen values and total variance explained by each factor

Component	Initial Eigen values		
	Total	Variances %	Cumulative %
Resource Planning	9.78	33.96	33.96
Budget Control	3.71	15.41	49.37
Supervision and Evaluation	2.44	11.09	60.46
Organization Management	1.73	6.23	66.69
Human resource management	1.06	4.93	71.62

Confirmatory factor analysis in lisrel software was used to confirm the final model. The findings related to fitting indices (Chi-square/df (χ^2/df), Goodness of fit index (GFI), Adjusted Goodness of Fit Index (AGFI), Normed fit index (NFI), Incremental Fit Index (IFI), comparative fit index (CFI). Parsimony Ratio (PARTIO), Parsimony comparative fit index (PCFI) and Root mean square error of approximation (RMSEA)), were all optimal and approved the model with five dimensions for the hospital holding governance. Table 3 demonstrate the fitting indices of the model.

Table3. Fitting indices of the model on hospital cost management

Statistics	Estimated Values	Optimal Value	Status of Index
χ^2/df	2.68	≥ 3	√
GFI	0.904	≤ 0.9	√
AGFI	0.913	≤ 0.9	√
NFI	0.943	≤ 0.9	√
IFI	0.921	≤ 0.9	√
CFI	0.904	≤ 0.9	√
PARTIO	0.781	≤ 0.5	√
PCFI	0.514	≤ 0.5	√
RMSEA	0.069	≤ 0.08	√

From the initial analysis of the interviews in the qualitative part of the present study, 247 initial codes were extracted, which by classifying these codes in related groups, finally 5 main dimensions and 35 phrases were obtained.

Figure 2 represent the hospital cost management model with five dimensions. In this model, there was a significant direct relationship between all factors and hospital cost management model. In addition, the highest and lowest standard coefficients were attributed to human resource management and resource planning, with factor loadings of 0.76 and 0.88, respectively.

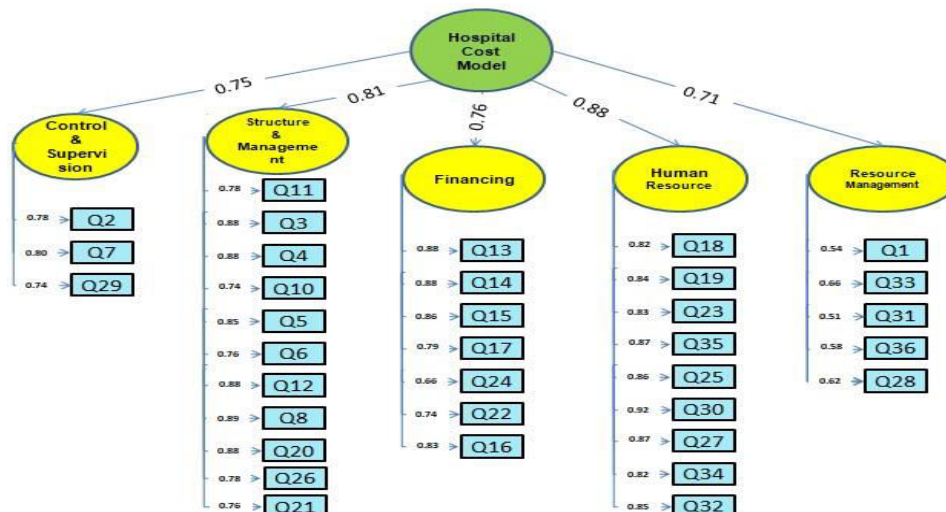


Fig2. Dimensions of hospital cost management model

Discussion

It is evident that the role of human resources in hospitals is important, so training and empowering of staffs is very important to increase their motivation. It has been believed that

education and motivation can change skills, knowledge, attitudes and social behavior. Mossadegh rad and his colleagues emphasized this issue (Mosadeghrad,2011). Esfahani and his colleagues mentioned the effect of education of staffs in decrease of cost and efficiency increment (Esfahani et al.,2018). The results of the present study also showed that Financing and reform in budgeting of hospitals is one of the important and effective reasons in hospital management. In this topic a study, have done in Austria shows that financial management and operational budgeting are the most important effect in curb costs. Khadka and chaulagain have been called cost management as an ability for hospital management in similar approaches (Khadka and chaulagain, 2012). In addition, Nuori and hassan have been recommended the budgeting system asa major stage of hospital management (Nuori and Hassan, 2020). Another dimension of cost management is supervision and control that research of Fenaroli and his colleagues have been indicated that mentioned factor is the best tools for hospital cost management (Fenaroli et al., 1987). Due to the importance of hospital cost management and the indigence of take practical actions to rationalize the cost reduction in the health sector, it is necessary that the cost management model has been implemented in hospitals as the most part of health system.

Conclusion

The results of this study showed that factors, Human resource management, Organization management, Supervision and Evaluation, Budget Planning has the greatest influence on the hospital cost management. Considering the health strategies of the social security organization and the necessity of reforms in the governance structures of hospitals, more attention should be paid to the Resource Planning, Budget Control, Supervision and Evaluation, Organization Management and human resource management. The result of the present study can be revealed that, for optimal hospital cost management, HR management and organization management should be emphasized.

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