

**Interrelated Factors with Hospital Financial Performance
from Hospital Managers' Perspective**

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From Hospital Managers' Perspective

Abstract

This study aims to investigate the interrelated factors regarding hospital financial performance by considering cost and quality indicators from hospital managers' point of view. Data collected from face-to-face interviews from ninety senior managers working in twenty different public and private hospitals in the Ankara metropolitan area. A path analysis was used to quantify both the direct effect of cost performance on quality performance and the indirect effect of cost performance on financial performance as mediated by a hospital's quality performance. A final path model highlights that constructs related to both cost and quality affect financial performance. Study results support the evidence that cost, quality, and financial performance indicators are causally related and quality indicators mediate these associations. The goodness-of-fit indices were acceptable ($X^2/df = 34.22/15 = 2.28$; RMSEA = 0.12; GFI = 0.90; AGFI = 0.81). Moreover, the results support the relationships among the constructs in which labor productivity and capacity utilization mediate the effect of clinical quality on patient satisfaction, and patient satisfaction mediates the effect of market share on operating profits. The present results are helpful to identify the associated factors of hospital financial performance and to extract the effect of sensible cost and quality factors on financial performance. Study results suggest some maintenance and operational actions to better manage financial performance by considering the mediating role of patient satisfaction.

Keywords: cost, quality, financial performance, hospital managers

Introduction

Hospitals dedicate substantial effort to improve their financial performance because of its ever-increasing existential role (Oner, Zengul, Ozaydin, Pallotta & Weech-Maldonado, 2016; Li, Benton & Leong, 2002). Financial performance measures provide an empirical basis for practicing managers in the non-profit sector to enhance organizational capacity, financial health, and performance (Prentice, 2015). Existing studies that focused on hospital management has been based exclusively on approaches to assess management by organizational structure and functions (Tsai et al., 2015). Most of these studies explore whether better management improves the efficiency and financial performance of health care organizations, and clinical engagement or not (Chandra, Finkelstein, Sacarny & Syverson, 2013).

Performance measurement starts with the basic measurement of financial transactions at the beginning of the 1970s. Early performance measurement models in health care were developed in the manufacturing sector and focused on financial indicators (van der Stede, Chow & Lin, 2006). With the rapid escalation of global health care costs, health policymakers have focused on cost control and performance evaluation programs. During that time, financial sustainability is essential for organizational survival and reflects the effectiveness and efficiency of health care organizations (Fottler, 1987). Increasing competition and diminishing resources serve to underscore common financial performance indicators. Given that better quality management is an important objective of every health system (Li, Benton & Leong, 2002), modern approaches integrate patient satisfaction and quality indicators into the study model. Patient satisfaction became popular from the late 1980s to the 1990s. Health care managers became aware that

quality of care can only be remedied by listening and responding to the patient's voice (Li, Benton & Leong, 2002).

Over the years, balanced performance measurement well suits the vortex and complex nature of health care (Sturmborg, O'Halloran & Martin 2012). These perspectives balance the attention paid to various parts of the organization. Financial and non-financial performance indicators constitute two main dimensions of these approaches. Balanced Scorecard (BSC) is a pioneering one among several multidimensional performance measurement approaches and is well-known and generally accepted (Giannini, 2015). Health care organizations' performance and quality evaluation systems are complex and include the measurement of economic and financial results (Giannini, 2015). Health care organizations easily incorporated BSC's financial, customer, internal business, learning, and growth perspectives into their performance measurement processes (Kaplan & Norton, 1992). Financial performance can be improved with holistic management approaches, including cost and quality management principles. In addition to cost and quality indicators, financial performance can be viewed as the interconnected management of leadership, employee management, customer focus, supplier, process, and data reporting (Tsai, Keswani & Bozic, 2019). Quality standards and service delivery affect the financial performance of hospital operations and its economic turnover (Tran & Vu, 2018). In other words, a mutual relationship seems to exist among a hospital's cost, quality, and financial performance through which one process feeds the others and vice versa. A change in a hospital's financial performance may lead to subsequent changes in quality, staffing, control, and other areas, in turn affecting patient outcomes.

The success of performance measurement depends not only on the selected performance indicator but also the person assessing the performance. Therefore, it may not be an overstatement to say that performance is shaped in the eyes of the beholder. When making complex decisions, managers may move away from rational analysis and rely instead on heuristics. Managers tend to be opportunistic and seek organizational benefits when assessing organizational performance. Agency theory, which is a conception based on psychology, addresses the realization of opportunistic behavior, such as managers' favoritism for their hospitals' performance (Ross, 1973). Moreover, if multiple performance measures are used to evaluate performance, the weights assigned to these measures should depend on measure sensitivity (Dai, Kuang & Tang 2018). The literature on performance measurement in health care organizations is replete with forceful debates over the sensitivity of performance measures (Ittner & Larcker 1998; Ittner, Larcker & Meyer, 2003). A measure's sensitivity entails two aspects: one that refers to objective measures and another that relates to subjective measures. Managers' performance evaluation decisions represent changes related to whether measures are objective or subjective. They are more influenced by objective than subjective performance measures because objective measures are based on an absolute criterion. Agency theory sheds light on both sides of performance measurement by suggesting that objective and subjective measures should be weighted equally in performance evaluations (Dai, Kuang & Tang 2018).

The distinction between objective and subjective performance measures becomes more obvious in the case of operational performance measurement because performance metrics used in performance measurement influence the decisions to be made at strategic, tactical, and operational levels (Bhagwat & Sharma, 2007). Financial performance is an operational performance indicator, such as cost and quality (Li, Benton & Leong, 2002). Existing knowledge about a hospital's financial performance is primarily focused on objective criteria rather than subjective evaluations. Hospitals' profitability and ability to grow equity are viewed as key factors in these efforts to maintain financial sustainability (Singh & Wheeler, 2012). The

pursuit of profits induces hospitals to generate higher profits given the capacity to finance investments using debt, and they paid higher wages to attract more qualified nurses and improve quality of care (Dong, 2015). In contrast, the provision of quality is costly for hospitals and requires financial strength. However, whether quality attracts financial resources or whether financial reserves support quality is unclear (Bunger, Despard, Lee & Cao, 2018). Evidently, understanding congruent interrelated factors with financial performance is the key to a hospital's viability (Li, Benton & Leong, 2002). This study contributes to what is currently a limited number of empirical studies on interrelated factors related to hospitals' financial performance by considering cost and quality indicators. Moreover, this study seeks to address the prevailing dearth of knowledge on the associated factors related to the financial performance from hospital managers' points of view. To the best of our existing knowledge, no prior investigation has been conducted to investigate interrelated factors with financial performance based on the subjective evaluations of hospital managers in the Turkish health system. The next section provides a theoretical background of the relationship among cost, quality, and financial performance indicators and financial performance assessments from a manager's perspective. Following this, the methodology and data analysis are presented in separate sections. The paper concludes with a discussion of the results and the implications of these results for hospital managers and researchers.

Theoretical background

Prior research related to this investigation can be divided into two major categories. First, considerable research has been related to linking cost, quality, and financial performance indicators. Second, a significant body of knowledge examines an organization's financial performance from managers' perspectives. This study supports the notion that incorporating cost and quality indicators is necessary to obtain a complete understanding of financial performance. We briefly review these two categories of research.

Relationship between cost, quality, and financial performance

Cost, quality, and financial performance are operational performance indicators that constitute the basis for infrastructural operations decisions. Hospital managers are given an idea of the operations decisions that should first be made to combat declining occupancy rates, nurse shortages, and poor financial performance (Li, Benton & Leong, 2002). Performance measures enhance each other, and hospitals' financial performance is indirectly affected by quality measures and directly by cost measures (Chaudary, Zafar & Salman, 2015). Scholars stated that improving cost and quality performance leads to better financial performance because good quality services tend to decrease waste during the service delivery process and prevent malpractice from occurring. Reducing waste leads to superior cost performance that, in turn, improves a hospital's financial performance. Inpatient costs, labor productivity, and capacity utilization are indicators of cost performance (Li, Benton & Keong Leong, 2002). Obviously, costs are incurred to achieve hospitals' quality requirements (Uyar & Neyis, 2018). Hospitals need to adopt financial management systems that can manage indicators of capacity utilization, such as higher patient volumes and costs. Patient flow is associated with revenues that significantly affect hospitals' financial performance (Singh & Wheeler, 2012). Labor productivity is another indicator of cost performance, and the healthcare workforce needs more attention (Hofmarcher, Festl & Bishop-Tarver, 2016). However, the scarcity of knowledge and

lack of comparative knowledge of the complex measures of labor productivity to account for improved outcomes or quality changes must be overcome (Hofmarcher, Festl & Bishop-Tarver, 2016).

Quality is a complex and multidimensional phenomenon influenced by a host of factors (Cefalu, Elliot, Setodji, Cleary & Hays, 2018). When investigating and understanding the quality performance of health care organizations the use of Donabedian's classification is helpful (Donabedian, 1997). This classification includes structure-process and outcome quality indicators. Three types of quality measures exist, including the following: (i) structure measures exist for resources available to health care organizations, (ii) process measures consist of activities involved in the health care delivery process, and (iii) outcome measures consist of the results of patient care (Donabedian, 1997). Quality is an operational performance indicator, and degrees of clinical quality and patient satisfaction are signs of health organizations' quality performance. In the broadest sense, health care managers concentrate their actions to satisfy their patients by improving clinic quality (Tsai, Orav & Jha, 2015). Clinical quality is described as the ability of hospitals to achieve high standards of patient health through medical diagnoses, procedures, and treatment—ultimately generating physical or physiological effects on patients (Marley, Collier & Goldstein, 2004). Patient satisfaction is fed from the quality of health services. Practically, hospitals with high patient satisfaction provided more efficient care with shorter lengths of stay and cost benefits. Thus, hospitals with boards that paid more attention to enhancing clinical quality achieved better patient satisfaction (Tsai, Orav & Jha, 2015). Accreditation standards help healthcare organizations effectively manage their resources. These standards are associated with variables that contribute to clinical care and organizational outcomes (Braithwaite et al., 2010).

Financial performance is another key area that can indirectly influence patients' perceptions of the quality of care through an increase in profitability (Cleven, Mettler, Rohner & Winter, 2016). Market share and operating profits are the common indicators to evaluate organizations' financial performance (Li, Benton & Leong, 2002). A hospital offering the highest quality of care may not serve the entire market, which leads to individual hospitals having various levels of market share. (Mougeot & Naegelen, 2005). A hospital's quality of care influence its future market share. Thus, market share was endogenous to quality, and the feedback effect from the quality of care on future financial performance is plausible (Sari, 2002). The effect of market share on profits was called the "market share effect" (Wu & Shen, 2011). Financial and market share characteristics appear to be associated with the structural constraints of hospitals, such as location, size, and teaching status (Kaufman et al., 2016). Another commonly used measure of hospital profitability is operating profit margin, which measures profitability by considering patient care services and other operating activities (Reiter & Song, 2011). The continuity of operating profits and the successful management of the patient revenue cycle play a prominent role in the financial stability of health care organizations (Rauscher & Wheeler, 2008). Success in the patient revenue cycle is a critical element to boost profitability, build equity capital, and remain financially viable over the long term. In this regard, hospitals need to embrace financial systems that can manage higher patient volumes and ensure patient access to financial information (Singh & Wheeler, 2012).

Linking cost, quality, and financial performance measures is difficult because of their indirect relationship. The impact of cost and quality on financial performance may be mediated or moderated by various other factors. Many other confounding factors at the organizational and market levels could exist, such as organizational culture and competition, which may make the relationship very complex and difficult to identify (Barnes, Oner, Ray & Zengul, 2017).

Although the contribution of improving quality on financial performance is obvious and foreseeable, more rigorous and robust research is necessary to empirically prove the relationship between quality and financial performance (Chaudary, Zafar & Salman, 2015). A limited number of studies suggested that the financial performance of health care organizations is influenced positively by firms' current liquidity and managerial efficiency but is negatively influenced by financial leverage (Magoutas, Chountalas & Konstantinidou, 2017). When a hospital earned more profit, had the capacity to finance investment using debt, and paid higher wages to attract more skilled nurses, its quality of care generally improved. The pursuit of profits induces hospitals to improve both the quality and quantity of the services they offer because a lack of financial strength may result in a lower standard of health care services (Dong, 2015). In contrast, some studies differed on the effect of quality on financial performance and suggested that quality-related practices directly affect financial results (Chaudary, Zafar & Salman, 2015). Therefore, the relationship between cost, quality, and financial performance indicators is still evolving. Hence, more research is needed to better understand and identify the elusive relationships among these variables.

Performance assessment from health care managers' perspective

The performance assessment is attractive because of its holistic, contextual, empirical, and empathic nature (Bentos, Carneiro, da Silva & Kimura, 2012). The components of this multifaceted phenomenon include prevailing distinct managerial priorities (Minvielle et al., 2008). Hospital managers are mindful of the long-term gains obtained from continuously monitoring performance. They must also be mindful of the fact that process quality is at least as important as clinical/outcome quality in predicting patient satisfaction (Marley, Collier & Goldstein, 2004).

Performance measurement is shaped in the eyes of the beholder. However, two perspectives and professions exist in health care organizations: medical professionals and non-medical professionals. Non-medical professionals are professional hospital managers. They have professional skills and abilities that are fully sufficient for the job at hand (Kautsch & Dela, 2019). Medical professionals prefer clinical care indicators, whereas non-medical professionals' prioritize multidimensional perspectives. One can easily assert that the holistic perspective is more suitable for the multifaceted nature of the hospital performance assessment than only the clinical-focused ones. Today, having non-physician health managers has been stated as popular and preferable, whereas professional health managers continue their entire career development in health care institutions (Kautsch & Dela, 2019). However, the medical leadership challenge for health care organizations continues (Andersson, 2015). Medical and non-medical professional managers take advantage of the ability to evaluate process quality more readily than clinical quality and, thus, increase patient satisfaction (Vogus & McClelland, 2016). In other words, health care managers must be aware of the importance of service operations on hospital performance (Vogus & McClelland, 2016). Additionally, they must be skilled in collaborative efforts rather than solely rely on vertical authority in the implementation of cost and quality management and must evaluate its effect on financial performance (Chaudary, Zafar & Salman, 2015).

Hospital systems may benefit from a deep understanding of managers' performance evaluation (Whaley & Gillis, 2018). Specifically, "agency theory," which is based on psychology, states that people tend to believe that information collected from non-human sources is more "scientific" than information based on human judgment. One of the reasons for this phenomena could be the perception that objective measures seem more accurate, reliable, and scientific

than subjective measures (Dai, Kuang & Tang 2018). When multiple performance measures are used, the general tendency is to overemphasize objective and common performance measures (Ittner, Larcker & Meyer, 2003) Thus, the combined use of objective and subjective performance measures is optimal. The prominent side of a subjective performance evaluation is that it leads to more compressed and more lenient evaluation results (van der Stede, Chow & Lin, 2006). Recent studies verified the remarkable relationship between subjective and objective performance measures and justified the use of subjective measures of business performance (Vij & Bedi, 2016). A health care manager’s subjective evaluations provide convincing evidence and offer clear proof-of-concept demonstrations of the enhanced performance of health services. Moreover, subjective evaluations reflect cognitive assessments and a way to catch managers’ feelings about organizational performance. Overall, subjective evaluations have strong potential to open new doors to understanding and exploiting health organizations’ performance. In this study, subjective performance assessments of hospital managers are captured to examine the pertinent information that cannot be objectively obtained about hospital performance.

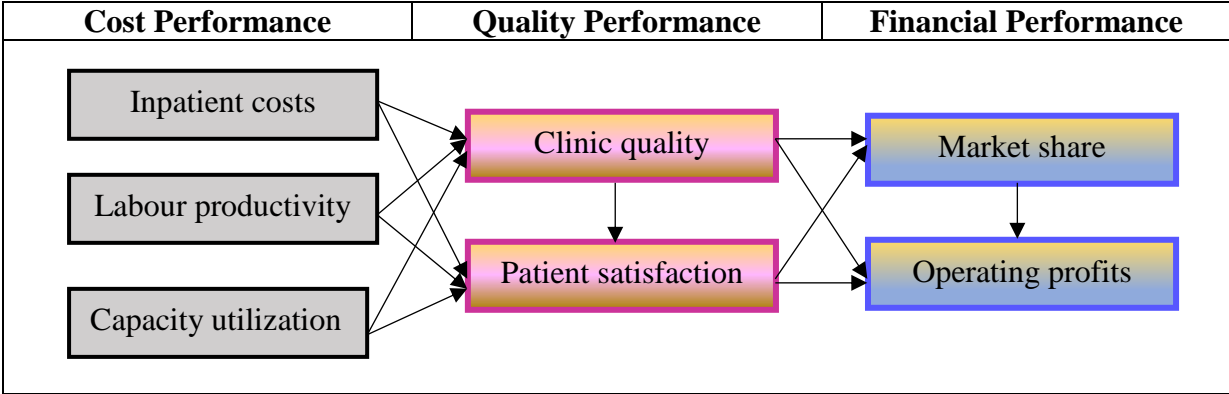
Based on our theoretical discussion, the complete framework of relationships proposed is a study model based on the relationship between cost, quality, and financial performance indicators. In this study, we use path analysis to test this framework within the hospital industry. This technique is ideally suited to determining the interrelationships among multidimensional models. The next section outlines the conceptual model and methodological details of this study.

Methodology

Conceptual model and hypotheses

Figure 1 presents a model of the relationship between cost, quality, and financial performance indicators. The conceptual framework of this study is based on a review of the literature (Buler, Leong & Everett, 1996; Heineke, 1995; Li & Benton, 1996; Li, 1997; Li, Benton & Leong, 2002) and author’s experience and intuitive thinking. The study model explores the cost and quality factors associated with hospital financial performance. This part of the study reviews the literature and develops hypotheses that link the following study variables: inpatient costs, labor productivity, capacity utilization, clinic quality, patient satisfaction, market share, and operating profits.

Figure 1 - Conceptual Framework



Cost performance

Health care organizations are pressured to combat increasing costs, ensure the quality of care, and secure financial resources (Bunger, Despard, Lee & Cao, 2019). High-quality health care services are costly, and managing financial resources when dealing with high costs is difficult. Strategies to handle increasing costs has led to improved quality management (Li & Benton, 2003).

The related hypotheses are as follows:

H1a: Holding down inpatient cost efforts will lead to better clinical quality.

H1b: Holding down inpatient cost efforts will lead to higher levels of patient satisfaction.

H1c: Attaining labor productivity will lead to better clinical quality.

H1d: Attaining labor productivity will lead to higher levels of patient satisfaction.

H1e: Maintaining high capacity utilization will lead to better clinic quality.

H1f: Maintaining high capacity utilization will lead to higher levels of patient satisfaction.

Quality performance

Clinical quality and patient satisfaction are commonly regarded as important outcomes of care (Forsberg, Vikman, Wälivaara & Engström, 2015). Improvements in quality will lead to the achievement of the financial goals of health care organizations. Specifically, hospitals that implement quality improvement can reasonably expect to improve their financial soundness (Alexander, Weiner & Griffith 2006).

The related hypotheses are as follows:

H2a: Improving clinical quality will lead to higher levels of patient satisfaction.

H3a: Improving clinical quality will increase market share.

H3b: Improving clinical quality will increase operating profits.

H3c: Improving patient satisfaction will increase market share.

H3d: Improving patient satisfaction will increase operating profits.

Financial performance

Strong financial performance promotes the efficient use of health care services and ensures the future sustainability of the health care organization (Hsiao, Chen & Wu, 2018). Market share and operating profits are the factors associated with hospital profitability (Bal & Anderson, 2016). A hospital's operational performance indicators, such as costs and quality, affect its financial performance (Li, Benton & Leong, 2002).

H4a: Improving market share will increase operating profits.

Research methodology

Data

In this study, data were collected to analyze the conceptual model presented in Figure 1. Questions used in this study gathered from Li, Benton, and Leong (2002) are presented in Appendix 1. This questionnaire asks hospital managers to compare their hospitals with competitors in terms of cost, quality, and financial performance. A five-point Likert scale was used to collect data. Most statements had response categories ranging from (1) significantly lower to (5) significantly higher (see Appendix 1). All of the Cronbach's alpha values meet the minimum criterion alpha value of 0.60, which is consistent with existing studies (Nunnally, 1978). Data were collected through face-to-face interviews with 90 hospital managers working in 20 different public and private hospitals in the Ankara metropolitan area. Interviewed hospital managers work as physicians-in-chief, deputy physicians-in-chief, heads-of-nursing, deputy heads-of-nursing, directors, and assistant directors. The adaptation process of the original survey questions included the following phases: (i) translation into Turkish, (ii) assessment of item comprehension, (iii) back-translation into English and (iv) development of the consensual version of the survey. The excuses for not answering the survey questions included too many surveys received by the hospital manager and low priority given to answering questionnaires. Ethical permissions were acquired from the hospitals ethical committees before the implementation of the surveys.

Path analytic model

The path analysis used in this study is a pragmatic one. The multivariate regression model represents a regression analysis that simultaneously considers multiple dependent (and often multiple independent) variables (Geiser, 2013). This analytical approach is a useful tool for testing a causal pathway for understanding the interrelationships among the study variables. This extended version of multiple regression can predict more than one dependent variable and can assess the relationships among both independent and dependent variables within that model (Beran & Violato, 2013; Norris, 1997).

In our examination, cost and quality indicators are causally related to financial performance indicators (Figure 1). Therefore, a path analysis was performed to examine the relationship among cost, quality, and financial performance indicators. In this study, the path analysis comprises the following seven elements: inpatient costs (inp_cost), labor productivity (lab_prod), capacity utilization (cap_util), clinical quality (clin_qua), patient satisfaction (pat_sati), market share (mark_sha), and operating profits (oper_pro).

Results

This section reports the descriptive statistics and path analytic model results. We also interpret the study findings by answering three specific questions. The first question is whether a hospital's cost performance positively affects its quality performance. The answer to this question proves or disproves hypotheses H1a–H1f. The second question sheds light on the associations among the quality indicators by focusing on whether improvements in clinical quality positively affect patient satisfaction. The answer to this question proves or disproves hypothesis H2a. The third study question identifies the elusive relationship between quality and financial performance indicators by asking whether hospital quality indicators positively affect financial performance indicators. Hypotheses H3a–H3d are proven or disproved by the answer to this question. The last question seeks to clarify the interrelationships among financial performance indicators. The question is whether an increase in market share positively affects operating profits. Interpreting the answer to this question proves or disproves H4a. The study findings are compared with the existing literature and discussed in section 5.

Descriptive statistics

The descriptive statistics for hospital managers are presented in Table 1. Specifically, the gender distribution is balanced, with 58.9% males and 41.1% females. The marital and educational status of managers shows that 72.2% of managers are married, and 44.4% graduated from a university. Additionally, a balance exists between hospital manager professions, where 27.8% is a manager, 24.4% is a doctor, and 34.4% work as an assistant director at the hospital.

Table 1 - Descriptive statistics for hospital managers

Variables					
Gender	n	%	Profession	n	%
Female	37	41.1	Doctor	22	24.4
Male	53	58.9	Nurse	19	21.1
Marital Status			Manager	25	27.8
Married	65	72.2	Unspecified	24	26.7
Not-married	25	27.8	Management duty at a hospital		
Education			Physician-in-chief	4	4.4
Associate degree	13	14.4	Deputy physician-in-chief	15	16.7
Graduate	40	44.4	Head-of-nursing	3	3.3
Master	6	6.7	Deputy head-of-nursing	16	17.8
General Medicine	5	5.6	Director	5	5.6
Medical Specialist	17	18.9	Assistant director	31	34.4
Unspecified	9	10	Unspecified	16	17.8
Total	90	100	Total	90	100

Average scores obtained from the assessments of hospital managers of cost, quality, and financial performance indicators of their hospitals relative to competitors show that the mean values for maintaining high capacity utilization, attaining labor productivity, and holding down inpatient cost efforts are 4.42 (± 0.77), 4.32 (± 0.89), and 2.88 (± 1.07), respectively. Moreover, average scores for quality performance indicators indicate 4.41 (± 0.80) for improving clinical quality and 4.47 (± 0.75) for improving patient satisfaction. Finally, the mean value for market share growth is 4.36 (± 0.81) and for operating profits is 4.42 (± 0.76).

Table 2 - Descriptive statistics for hospital managers' assessment about cost, quality, and financial performance indicators

Variables	Mean	SD
Cost Performance		
Holding down inpatient cost efforts	2.88	1.07
Attaining labor productivity	4.32	0.89
Maintaining high capacity utilization	4.42	0.77
Quality performance		
Improving clinical quality	4.41	0.80

Improving patient satisfaction	4.47	0.75
Financial performance		
Market share growth	4.36	0.81
Operating profit	4.42	0.76

Pearson correlation coefficients are used to estimate relationships among the variables in the model (Table 3). Most of the study variables exhibited no correlation to very low correlation, which rules out multicollinearity and further enlightens the model-building process. The highest correlation score was 0.70 and was between capital utilization (C3) and inpatient cost (C1). Thus, all study variables are included in the path analysis process.

Table 3 - Correlations

Variables	r_p	C ₁	C ₂	C ₃	Q ₁	Q ₂	F ₁	F ₂
inp_cost (C ₁)	r_p	1						
lab_produc (C ₂)	r_p	0.018	1					
cap_utiliz (C ₃)	r_p	0.009	0.700**	1				
clin_qua (Q ₁)	r_p	-0.110	0.685**	0.580**	1			
pat_sati (Q ₂)	r_p	-0.074	0.656**	0.553**	0.647**	1		
mark_sha (F ₁)	r_p	-0.129	0.582**	0.542**	0.599**	0.658**	1	
oper_pro (F ₂)	r_p	-0.080	0.682**	0.611**	0.662**	0.610**	0.623**	1

Abbreviations: r_p : Pearson correlation coefficient, **: $p < 0.01$, **inp_cost**: inpatient costs; **lab_produc**: labour productivity; **cap_utiliz**: capacity utilization; **clin_qua**: clinical quality; **pat_sati**: patient satisfaction; **mark_sha**: market share; **oper_pro**: operating profit.

Path analysis results

Path analysis was performed assuming bidirectional and unidirectional causal relationships among yield components of cost, quality, and financial performance indicators. An analysis was performed on the variance-covariance matrix. Prior path models indicate significant chi-square values significant (Chi-square = 25.07; df = 6; $p < 0.0001$). However, t values, which are presented with red for inpatient costs (inp_cost) and patient satisfaction (pat_sati), labor productivity (lab_prod) and patient satisfaction (pat_sati), capital utilization (cap_util) and patient satisfaction (pat_sati), clinical quality (clin_qua) and market share (mark_sha), clinical quality (clin_qua) and operating profits (oper_pro), patient satisfaction (pat_sati) and operating profits (oper_pro) are insignificant ($p > 0.05$). Because of these unmeaningful t values in this path model, the path links of inp_cost and pat_sati, lab_prod and pat_sati, cap_util and pat_sati, clin_qua and mark_sha, clin_qua and oper_pro, and pat_sati and oper_pro are removed from the prior model. Therefore, hypotheses H1b, H1d, H1f, H3a, H3b, and H3d were rejected.

Figure 2 - Prior path analytic model (t values)

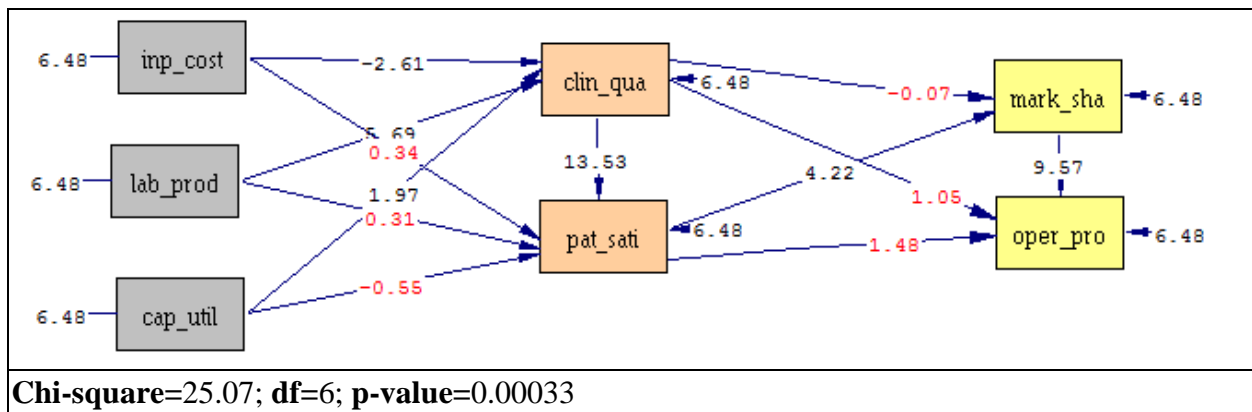
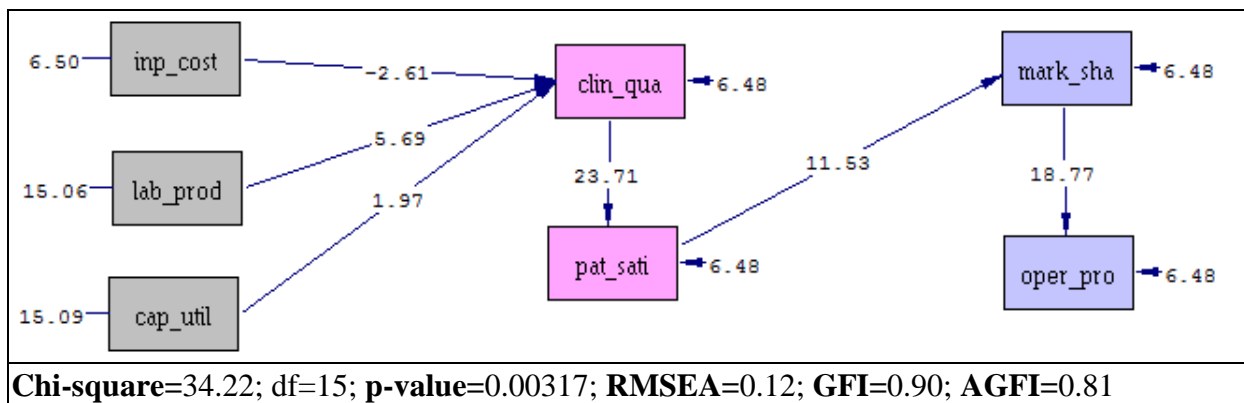


Figure 3 and 4 presents t values and standard path coefficients obtained from the final path model. Figure 3 highlights that the t values obtained from five paths are meaningful ($p < 0.05$). The Chi-square value for the measurement model is significant (Chi-square = 34.22; df = 15; $p < 0.01$).

Figure 4 provides standard path coefficients of the final model, which indicate that overall goodness-of-fit indices for the model are acceptable. The value for the root mean square error is 0.124; the value for the goodness-of-fit index (GFI) is 0.90, and the adjusted GFI (AGFI) is 0.81. As a reminder, these values exceed the recommended values of 0.05–0.10 for RMSEA, 0.90 for GFI, and 0.81 for AGFI (Bentler, 1990).

Figure 3 - Redefined final path model (t values)

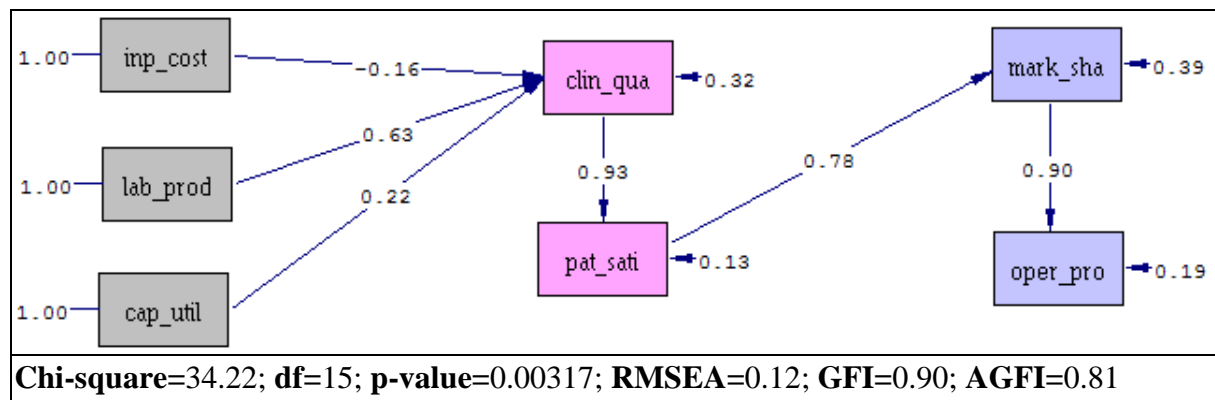


The final model highlights that the standard path coefficients of the final path analytic model are significant. Holding down inpatient cost efforts has a direct and negative effect on clinical quality (path coefficient = -0.16 ; $t = -2.61$). H1a states that holding down inpatient cost efforts leads to an increase in clinical quality. These results do not support H1a, which was rejected. Attaining labor productivity has a direct and positive effect on clinical quality (path coefficient = 0.63 ; $t = 5.69$). We hypothesized that attaining labor productivity will lead to clinical quality (H1c). These results support H1c. Maintaining high capacity utilization has a direct and positive effect on the clinical quality (path coefficient = 0.22 ; $t = 1.97$). H1e states that maintaining high capacity utilization will lead to clinic quality. These results also support H1e. Predictably, clinical quality has a direct and positive effect on patient satisfaction (path coefficient = 0.93 ; $t = 13.53$).

= 23.71). H2a points out that an increase in clinical quality has a positive effect on patient satisfaction. Thus, H2a is accepted. Improving patient satisfaction has a direct and positive effect on market share (path coefficient = 0.78; t = 11.53). H3c states that improving patient satisfaction leads to an increase in market share, which is supported by these results. Finally, an increase in market share has a direct and positive effect on operating profits. H4a points out that improving market share will increase operating profit, which is supported by these results.

The study results emphasize and support the concepts in H1c and H1e, which state that better cost management has a positive effect on clinical quality, including attaining labor productivity and maintaining high capacity utilization. Besides, the study results strongly support the relationship among quality indicators by validating H2a, which states that clinical quality has a positive effect on patient satisfaction. Moreover, the results of this study point out another positive and significant relationship between quality and financial performance indicators through H3c, which states that improving patient satisfaction increases market share. This supportive notion is that quality performance has a positive and significant effect on market share. The last finding of this study sheds more light on H4a and shows that market share has a positive and significant effect on operating profits. This result supports the positive interrelationships among financial performance indicators.

Figure 4. Redefined final path model (standard path coefficients)



Discussion

Key findings

The findings of this study support the interrelated nature of the cost and quality factors using hospitals' financial performance. The key findings of this study go one step further and illuminate this interlinkage from the hospital manager's perspective. Although the relationship between hospital operational performance indicators is highly prevalent, there is a lack of knowledge on hospital managers' opinions. On this occasion, the key findings of this study contribute to the existing body of knowledge by filling the gap on the effect of cost performance indicators on financial performance by considering the mediating role of quality performance indicators.

The key findings obtained from this study provide insights into the fundamentals of the subjective performance assessment of health professionals. The study results show that labor productivity and capacity utilization indirectly affect market share and operating profits under the effect of clinical quality and patient satisfaction indicators. An interesting study finding is that patient satisfaction is highly associated with market share. The literature shows a stark lack

of interest in the factors that are interrelated with hospital financial performance from the hospital manager perspective (Li, Benton & Leong, 2002). The design of this study and its results help us go one step further than this conjecture by empirically proving the strong and indirect mediating role of patient satisfaction in the linkage among financial performance indicators. Also, a strong relationship exists among quality performance indicators through the effect of clinical quality on patient satisfaction. Moreover, financial performance indicators, such as market share and operating profits, are strongly interrelated. Specifically, this study is explorative and helpful in understanding hospital managers' point of view on hospital performance indicators. The following inference can be made: the subjective assessments of hospitals' top managers may serve as a valuable tool to understand hospital performance with the limited objective performance data.

This study is explorative in nature and, to the best of our knowledge, the first effort to empirically investigate the interrelationship among cost, quality, and financial performance indicators from hospital managers' perspective in Turkey. A hospital's financial performance is an essential prerequisite for its survival. However, existing studies provide poor subjective assessments of hospital managers regarding the associations among hospital performance indicators. In light of the key findings of this study, it is highly advisable for health professionals to consider the mediating role of quality indicators to improve the management of hospital costs and financial performance indicators. Considering the subjective evaluations of health professionals provides valuable insights into the state-of-the-art of performance measurement in hospitals, it is highly advisable for health professionals to take cognizance of the interrelationship among issues highlighted among hospital performance indicators to more effectively manage health services. The corollary of this advice is the recognition that clinical quality is not only an interdisciplinary process designed to raise the standards of delivery of care but also a part of the patient-centered health services provision concept. Thus, promoting clinical quality will enhance patient satisfaction and be positively reflected through a hospital's financial performance. Even more prominent results of this study emphasize the associations among the hospital financial performance indicators. Specifically, these findings are useful in identifying the positive and significant effect of market share on operating profits.

What this study adds to what was known

The interrelationships among hospital performance indicators are of significant interest to health professionals (Li & Benton, 1996; Li, Benton & Leong, 2002; Raju & Lonial, 2002; Barnes, Oner, Ray & Zengul, 2017). The existing literature has indicated significant interest in the relationship between hospital performance indicators and ascertained the differences and weaknesses of hospital managers' performance evaluations. Moreover, managers' performance evaluation decisions are influenced more by objective than by subjective measures (Dai, Kuang & Tang, 2018). Despite objective performance evaluations based on rational and scientific foundations, subjective assessments reflect the perceptions of the evaluators. In other words, subjective assessments are based on individuals' observations, experiences, and senses regarding hospital performance. The psychology literature based on agency theory points out the weakness of subjective performance assessments and suggests that hospitals' top managers have opportunistic intentions when assessing their organizational performance (Ross, 1973).

Difficulty in linking hospital performance indicators is due to the indirect relationships that exist among them. The impact of cost and quality indicators on financial performance may be mediated or moderated by various factors. Organizational culture, the degree of competition, or managed care penetration make relationships more complex and difficult to identify. The existing knowledge emphasizes the complex nature of performance measurement in health care.

It has been stated that safe, patient-centered care and timely, efficient, and equitable health services are strongly related to health care quality and financial performance (Barnes, Oner, Ray, & Zengul, 2017). However, scant knowledge exists on the effect of cost and quality indicators on financial performance, especially from the hospital manager perspective. Hardly surprising is that hospitals' objective performance measures are preferable in the literature because of the strong belief that they are based on rational assessments (Ross, 1973). The results of this study add to previous hospital performance assessment studies by emphasizing the strong association among cost and financial performance indicators under the intervening role of health care quality indicators. The quality performance is essential to achieve a competitive advantage through enhanced quality productivity, improved customer satisfaction, and profitability (Shafiq, Lasrado & Hafeez, 2019). Improvements in clinical quality and patient-centered care are significant components of high-quality health care systems (Tsai, Orav & Jha, 2015).

In contrast, clinical quality improvement is a journey and not a destination. Thus, continuous quality improvement efforts to achieve accreditation standards are significant components for enhancing clinical quality and ensuring patient satisfaction. This study adds to the burgeoning evidence linking hospital cost and financial performance indicators under the intervening effect of quality performance. Another contribution of this study is providing insights into the positive and significant effect of patient satisfaction on market share. Market share improvements are significant in tying quality of care improvement efforts with financial performance. A hospital's quality of care affected its future market share and has strong potential to influence financial performance (Sari, 2002). Thus, the strong association among cost, quality, and financial performance indicators provides ample avenues for future research. It is highly advisable for hospital managers to continue to increase their market share, satisfy their patients, have a strong reputation in the market they serve, and certify their quality of health care services and financial performance.

Strengths of this study

Despite growing awareness of the interrelations among hospital performance indicators, an examination of the associated factors with financial performance requires more attention. The strength of this study lies in the fact that it has empirically demonstrated the interrelationship among cost, quality, and financial performance indicators from the viewpoint of hospital managers. In this way, the original contribution of this study called for an alternative perspective to understand linked factors with hospitals' financial performance. In this regard, the study results are fruitful for the drawing attention of hospital top managers to the multi-faced dynamics of financial performance. This effect opens the way for the awareness that financial performance not only consists of numeric evaluations but also is shaped by perceptions of hospital top managers on cost and quality indicators. This strong side of the study necessitates an analysis of hospital financial performance from a broader perspective by considering the self-evaluations of hospital managers. The results of this study paved the way for a deep understanding of the factors associated with the financial performance of hospitals by analyzing data from one of the metropolitan areas of a developing country. Further studies could incorporate into the analysis of rural areas of a country and compare the study results with those of other countries at different development levels.

Limitations of this study and recommendations for future studies

This study is not without limitations. Considering the subjective evaluations of health care managers in performance assessments provides a one-sided evaluation. Future studies may combine subjective and objective evaluations and compare the strength of the associations among cost and quality dimensions. Moreover, the results of this study indicate that a strong commitment to both quality and marketing is essential to improving hospitals' financial performance. In this regard, future studies may focus more on the association between quality and financial performance indicators. For future researchers, finding pragmatic ways to take a more integrative approach of cost, quality, and financial performance would be important. Finally, the results of this study are based on hospital senior managers' evaluations that make comparisons with other hospitals. Future studies may concentrate more on drawing on the competitive factors related to hospitals' financial performance.

Conclusion

To conclude, this study has empirically demonstrated the strong associations among cost, quality, and financial performance indicators. This investigation shows that the interrelationships among cost and financial performance indicators are mediated by quality performance. Hospitals may improve their financial viability by giving equal importance to control costs and improving the quality of care delivered to patients.

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Appendix-1. Survey questionnaires

Hospital performance indicators	Significantly lower		Equal		Significantly higher
Cost performance (Cost performance as compare to your competitors)					
Holding down inpatient costs	1	2	3	4	5
Attaining high labor productivity	1	2	3	4	5
Maintaining high capacity utilization	1	2	3	4	5
Quality performance (Quality performance as compare to your competitors)					
Clinical quality	1	2	3	4	5
Customer (patient) satisfaction	1	2	3	4	5
Financial performance (Financial performance as compare to your competitors)					
Market share growth	1	2	3	4	5
Operating profit	1	2	3	4	5