

Assessment of Quality Management Practices Within the Healthcare Industry

¹William J. Miller, ²Andrew T. Sumner and ³Richard H. Deane

¹Department of Management, J. Whitney Bunting College of Business,
Georgia College and State University, Milledgeville, GA, 31061

²Institute of Health Administration,
Robinson College of Business, Georgia State University, Atlanta, GA

³Department of Managerial Sciences,
Robinson College of Business, Georgia State University, Atlanta, GA

Abstract: Problem Statement: Considerable effort has been devoted over the years by many organizations to adopt quality management practices, but few studies have assessed critical factors that affect quality practices in healthcare organizations. The problem addressed in this study was to assess the critical factors influencing the quality management practices in a single important industry (i.e., healthcare). **Approach:** A survey instrument was adapted from business quality literature and was sent to all hospitals in a large US Southeastern state. Valid responses were received from 147 of 189 hospitals yielding a 75.6% response rate. Factor analysis using principal component analysis with an orthogonal rotation was performed to assess 58 survey items designed to measure ten dimensions of hospital quality management practices. **Results:** Eight factors were shown to have a statistically significant effect on quality management practices and were classified into two groups: (1) four strategic factors (role of management leadership, role of the physician, customer focus, training resources investment) and (2) four operational factors (role of quality department, quality data/reporting, process management/training and employee relations). The results of this study showed that a valid and reliable instrument was developed and used to assess quality management practices in hospitals throughout a large US state. **Conclusion:** The implications of this study provided an understanding that management of quality required both a focus on longer-term strategic leadership, as well as day-to-day operational management. It was recommended that healthcare researchers and practitioners focus on the critical factors identified and employ this survey instrument to manage and better understand the nature of hospital quality management practices across wider geographical regions and over longer time periods. Furthermore, this study extended the scope of existing quality management literature to the healthcare industry throughout an entire state and contributed to theory about the nature of quality management practices.

Key words: Survey, hospitals, factor analysis, quality management practices

INTRODUCTION

Over the years many organizations have devoted considerable effort in adopting quality management practices and several studies have been published assessing quality management practices in various settings. These studies assessed firms across industries and internationally, comparing manufacturing and service firms, focusing on small firms and within specific industries^[1-4]. Typically, within an industry a few leading organizations have been early adopters who have taken initial steps in implementing quality

management practices and oftentimes they have been followed by other organizations who have made additional applications and refinements of quality practices. Eventually, as numerous organizations make efforts to transform themselves according to the principles of quality management, the industry as a whole may undergo a paradigm shift toward quality improvement (e.g., the automobile industry)^[5-7]. Since the adoption of quality management practices tends to progress as an industry-based phenomenon, it is important that studies be undertaken that focus on quality management practices at the industry level. This

Corresponding Author: William J. Miller, Department of Management, Georgia College and State University, Milledgeville, GA, 31061 Tel: 478-445-2572 Fax: 478-445-0602

study supports an industry-based focus by developing an instrument to measure the quality management practices of organizations throughout a single industry (i.e., acute care hospitals) and throughout a large geographical area (i.e., a large US state). The intent of this study is to develop a better understanding of the nature of quality management within an important industry (which consumes almost 17% of the US GDP) and to assist healthcare executives to more effectively identify and manage best quality practices. Furthermore, this study is intended to contribute to management theory about the nature of quality management practices over time and extend the scope of existing literature, which necessarily has been more general in context since much of the literature has been focused on applications to all organizations in all industries.

In the mid to late 1970s the quality reputation of Japanese products radically changed from being poor to that of being superior to those made elsewhere in the world^[8,9]. This change in reputation was due to the fact that Japanese organizations developed innovative approaches to manufacturing and quality management that enabled them to produce superior quality goods at lower costs. As a result, Japanese quality management and manufacturing techniques were examined and prescriptions were presented as to how US organizations should change in order to remain competitive^[10-13]. Looking broadly at the general quality management literature, it is evident that the various experts take a number of different approaches when prescribing how quality should be managed. For example, Juran presented quality management as three basic processes: Quality planning, quality improvement and quality control, while Deming discussed 14 principles by which quality should be managed and recommended fundamental alteration of the culture of the organization^[14,10]. Crosby prescribed a 14-step program that emphasized quality improvement through a philosophy of zero-defects and Feigenbaum develop the concept of total or company-wide quality control which Monden later built upon^[5,15,16].

US organizations competing for the Malcolm Baldrige National Quality Award are evaluated on seven criteria: Leadership; strategic planning; customer focus; measurement, analysis and knowledge management; workforce focus; process management; and results^[17]. Manufacturing organizations seeking European ISO 9000 certification must meet eight broad quality management principles: Customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to decision making and mutually beneficial supplier^[18].

While the widespread quality movement in organizations began in manufacturing industries, it rapidly spread to the service sector. The Hospital Corporation of America (HCA) is generally given credit for the first widespread application of TQM principles to hospitals, when the HCA CEO directed all of its hospitals to adopt Deming's principles to HCA hospitals in the early 1990s^[19]. With concern for the well-being of patients, a clinical quality focus in the healthcare filed actually preceded the quality attention in manufacturing by several decades. Clinical quality standards were developed as early as the 1910s with the Flexner report, Medicare included quality requirements in the mid 1960s and Donabedian developed the concept of structure, process and outcome as a conceptual way of analyzing healthcare quality in the late 1970s^[20]. Berwick is commonly cited as the first to introduce widespread quality management principles in the healthcare industry and its evolution in healthcare has followed the typical pattern for other industries^[21]. Early quality articles in the healthcare field presented theoretical discussions of how organizations could benefit from adopting the new quality philosophy and methods and these articles were followed later by case studies illustrating how specific organizations dealt with the quality management implementation process^[19,22-31]. Along with these articles showing the positive aspects of the quality movement for hospitals, contrary views were also be found expressing skepticism as to the appropriateness of applying quality management to hospitals^[32-34]. Some recent studies have examined quality management practices in healthcare organizations and have described a number of different factors and international settings. Four studies have assessed the relationship between quality improvement, financial performance, competitive advantage and employee commitment in US hospitals and nursing homes^[35-38]. Among the international studies, one examined individual and collective implementations of TQM factors in Jordanian hospitals, another assessed Spanish hospitals and their choice of quality management system, a third studied barriers to TQM implementation in Turkish public hospitals and another study assessed quality implementation, quality management practices and business performance in hospitals located in Spain, UK and the Netherlands^[39-42].

In one major study Saraph, Benson and Schoeder^[43], classified the critical factors of quality management have been classified into eight categories as follows: The role of management leadership, the role of the quality department, training, product/service design, supplier quality management, process

management, quality data and reporting and employee relations. The authors intended that these eight factors be representative of the entire quality management practices construct; however, they acknowledged that customer focus may also be a separate factor that should be taken into consideration; therefore, items measuring this factor were added to the survey used in this study. While the nine factors of quality management identified above could be used to measure the quality management practices of hospitals, the literature suggests that the role of the physician is an important factor that is unique to hospitals and should be taken into consideration in addition to the other nine factors. Since the physician represents an important element in hospital service delivery, yet cannot be classified as distinctly as employee, supplier, or customer, a tenth important factor was added as representative of the hospital quality management practices construct. Thus, a total of 10 quality management practices was the focus of this study as follows: Role of management leadership, role of the quality department, training, product/service design, supplier quality management, process management, quality data and reporting, employee relations, customer focus and role of the physician.

MATERIALS AND METHODS

While many of the published studies which have assessed quality management practices have used several different instruments, the one developed by Saraph, Benson and Schroeder^[43] has been used and adapted by many researchers in a number of different settings across a wide range of industries^[44-49]. In this study a new survey instrument, termed the Hospital Quality Management Practices Instrument (HQMP), was developed which was based upon the Saraph instrument and used for measuring the aforementioned 10 quality management practices. To make the Saraph instrument suitable for the measurement of quality management practices in hospitals considerable changes were required. Fifty-eight survey items were initially identified to measure quality management practices over the 10 quality practices in hospitals. A pilot survey was sent to several academicians and practitioners knowledgeable about the management of quality in hospitals in order to assure the validity of the newly developed HQMP instrument. These individuals were asked to assess each item on the survey and to identify items that were adequate, items that needed to be reworded, items that should be eliminated because they did not add value and items that should be added in order to adequately measure quality management in hospitals. Responses from these individuals were used

to develop the final version of the survey. With this approach, content validity of the quality management practices section of the survey instrument was established.

To assure that responses to the survey were as accurate as possible, the instrument was sent to hospital CEOs with a request that it be completed by the individual most familiar with the hospital's quality management practices for the last five years. The instrument requested that the respondent's name, the number of years with the hospital and the number of years experience in quality management be provided as well. These items enhanced the validity of the survey's responses to the extent that respondents might have felt more personal accountability for their responses. In order to assure a high response rate and subsequently an adequate representation of the population of interest for the study, the Total Design Method of Dillman was utilized in the administration of the survey^[50]. This method included: Designing the instrument to be as attractive and as simple to complete as possible, addressing all correspondence to specific individuals, sending an introductory letter a week before the survey, designing a survey cover letter that emphasized the value to the respondent of completing the survey, sending second surveys to non-respondents within one month after the first surveys and calling non-respondents to encourage participation two weeks after the second survey.

Survey and reliability analysis: A total of 189 surveys were sent to state hospital association member hospitals. Three weeks after the initial mailing, 113 follow up letters with surveys were sent to non-respondent hospitals. Two weeks subsequent, follow up calls were made to 65 non-respondent hospitals. One survey response explained that it was meant to respond for a system of three hospitals. In order to adjust for this, variables were combined for those hospitals. The net response rate of 75.9% (142 of 187) or a gross response rate of 75.53% (142 of 189) can be considered exceptional and provides evidence of the extent to which hospitals were concerned about the topic of quality management. While 142 completed surveys were received from hospitals, not all responding hospitals were included in the analysis. Ten hospitals were excluded because of failure to complete the section of the survey that represented the same time frame as the other available data bases. In addition, four military, nine psychiatric and seven specialty hospitals were excluded from the study as non-representative of general hospitals. The focus of the analysis and subsequent findings of the study was 112 acute care hospitals.

Table 1: Reliability analysis for 112 acute care hospitals

Items	Quality management dimension	Alpha coeff.
H03-05*	Customer focus	0.8465
H06-11	Employee relations	0.8895
H12-16	Role of physician	0.8899
L01-08	Role of management leadership	0.9354
L09-14	Role of quality department	0.9258
L15-19*	Training	0.8713
P01-05	Process management	0.8387
P06-10	New service design	0.9125
P11-14	Supplier quality management	0.7153
P15-16,18-22*	Quality data and reporting	0.9202

***Items eliminated:**

- H01: The quality improvement program is patient-focused
- H02: Quality improvement is emphasized by public relations and marketing personnel
- L20: Training in advanced statistical techniques (such as design of experiments and regression analysis) is given
- P17: Hospital cost of quality data (costs associated with quality improvement) are monitored and are available

Reliability of the items measuring quality management practices was tested by means of the internal consistency method^[51]. The impact of each item was evaluated based on the reliability (i.e., Chronbach's alpha) of the combined items designed to measure each quality management dimension. Those items that did not improve the reliability of the dimension were removed from further analysis because they were considered as unreliable measures of the dimension that they were designed to represent. Once unreliable items were removed, reliability coefficients of 0.70 or more were considered adequate as evidence of the internal validity of each dimension of quality management practices. Table 1 summarizes the results of the reliability analysis performed. As can be seen, the resulting alpha coefficients for each quality management dimension were better than the 0.70 that is generally considered acceptable^[52].

Fifty-eight survey items were initially designed to measure quality management practices in hospitals. In order to reduce these items to an interpretable set of variables, factor analysis was performed using principal component analysis with an orthogonal rotation. All reliable items measuring quality management practices were included in a single factor analysis, assuming the ten factor solution, based on the literature. Items with significant loadings of 0.40 or greater were used to label factors^[52].

Factor selection: Forty-five survey items, representing eight dimensions of quality management practices, can be considered to adequately represent the quality management practice construct and were included in the factor analysis and subsequent research. While it was originally expected that there were ten dimensions associated with quality management

practices in hospitals, preliminary analyses tended to produce less satisfactory results. Factor analyses that included items representing the ten dimensions tended to produce some factors that were not definable. Similarly results of cluster analyses that included items representing the ten dimensions were difficult to interpret. Reconsideration of hospital quality management processes led to a decision to exclude items measuring two of the proposed dimensions: Supplier quality management and new service design. Supplier quality management has been identified as an important dimension of quality management practices, especially with regard to the manufacturing firms that were the primary focus of the Saraph survey^[43]. For hospitals, however, organizations heavily focused on individuals providing professional services, supplier quality management should involve consideration of the means by which human resources (doctors, employees, contractor workers, volunteers) are brought into the organization. Since items in the survey were not adapted to take anything but equipment and supplies in account, items representing this dimension were excluded from the study.

Similarly the ongoing and deliberate process of research and development associated with the design and implementation of new services in manufacturing firms is much different from the process by which new services are adopted and implemented in hospitals. In hospitals decisions about adding new services tend to be made at the level of top management and often without the knowledge of staff and implemented with the assistance of outside experts familiar with the new services. In manufacturing firms where new products and services are developed based on the ongoing efforts of research and development departments typically with the involvement of many levels of staff, decisions about adding new service are considerably different than those in hospitals. For this reason, since the nature of new service design is so different in hospitals and may not indeed be a factor associated with the management of quality, items representing the new services design dimension of quality management practices were also excluded from the study.

RESULTS

Of the 189 surveys mailed to hospitals, 142 were completed but not all responding hospitals were included in the analysis. The focus of the analysis and subsequent findings of the study was 112 acute care hospitals. Of the 58 initial survey items to measure hospital quality management practices, 13 were eliminated from consideration and all 45 remaining

items were analyzed utilizing a single principal component factor analysis with orthogonal rotation with an eight factor solution. Items with significant loadings of 0.40 or greater are shown for each factor in Table 2-9 and interpreted in the following sections.

Factor 1-the role of the quality department: As can be shown in Table 2, the first factor represents primarily items measuring the role the quality department plays in managing quality. This factor can be designated as focusing on the operational aspects of managing quality.

Factor 2-the role of management leadership: Table 3 shows that all items loading on the second factor represent top management’s role in the management of quality. These loadings include not only the items designed to measure the role of management leadership dimension but a training item (L15) that also focuses on the role of top management. This factor can be designated as focusing on the strategic aspects of managing quality.

Factor 3-quality data and reporting: Table 4 shows that all items loading on the third factor represent quality data and reporting. These loadings include not only the items designed to measure the quality data and reporting dimension but a process management item (P02) that also focuses on quality data and reporting. This factor can be designated as focusing on the operational aspects of managing quality.

Factor 4-the role of the physician: Table 5 shows that the items loading on the fourth factor represent primarily items measuring the role the physician plays in managing quality. This factor can be designated as focusing on the strategic aspects of managing quality.

Factor 5-customer focus: Table 6 shows that items loading on the fifth factor represent primarily items measuring the importance of focusing on the customer in managing quality. This factor can be designated as focusing on the strategic aspects of managing quality.

Table 2: Factor loadings: The role of the quality department

Item No.	Item Description	Loading
L10	The quality improvement department maintains visibility throughout the hospital.	0.7749
L14	The quality improvement department is instrumental in improving quality performance.	0.7460
L13	Extensive interface is maintained between the quality improvement department and other departments.	0.7245
L11	The quality improvement department maintains autonomy.	0.7020
L12	Quality improvement department professionals are often used as a consulting resource within the hospital.	0.6989
L09	The quality improvement department has access to hospital top management.	0.6559
H16	Quality improvement data are consistently made available to physicians.	0.4263

Table 3: Factor loadings: The role of management leadership

Item No.	Item Description	Loading
L01	Hospital CEO assumes responsibility for quality improvement performance.	0.7555
L04	Hospital top management sets specific objectives for quality improvement.	0.7413
L05	Hospital top management reviews quality improvement activities in meetings.	0.7104
L03	Hospital top management supports the long-term quality improvement process.	0.6841
L06	Hospital top management considers quality improvement as a way of gaining market share.	0.6241
L02	Hospital top management (CEO and department directors) is evaluated for quality improvement performance.	0.5471
L07	Hospital department directors accept responsibility for quality improvement.	0.4964
L08	Quality improvement goals are understood by staff in general within the hospital.	0.4161
L15	Top management creates an expectation that all employees will participate in quality-focused training.	0.4016

Table 4: Factor loadings: Quality data and reporting

Item No.	Item description	Loading
P21	Quality improvement data are available to hourly/non-supervisory employees.	0.7612
P16	Quality improvement data are used as tools to manage quality.	0.7535
P20	Quality improvement data are available to managers and supervisors.	0.6445
P22	Quality improvement data are used to evaluate supervisor and managerial performance.	0.6274
P15	Quality improvement data are available and are used routinely to improve existing processes.	0.5438
P19	Data about the quality of non clinical areas are monitored and are available.	0.4861
P02	Statistical control charts are used to monitor processes throughout the hospital.	0.4685

Table 5: Factor loadings: The role of the physician

Item No.	Item description	Loading
H12	Physicians participate in quality improvement planning.	0.7623
H14	Physician involvement is sought for clinically-based quality improvement initiatives.	0.6743
H16	Quality improvement data are consistently made available to physicians.	0.6286
H15	Physician involvement is sought for non-clinically-based quality improvement initiatives.	0.6156
H13	Quality improvement training given to physicians is consistent to that given to other staff.	0.6127
P04	External data sources are used to evaluate quality of care.	0.4949
H11	Employees are recognized for superior quality improvement performance.	0.4696
P18	Hospital quality of care data (clinical outcomes of care delivered) are monitored and are available.	0.4387

Table 6: Factor loadings: Customer focus

Item No.	Item Description	Loading
H03	Patient satisfaction is consistently monitored and changes are made in response to the data collected.	0.7031
H04	Patient satisfaction data is regularly reported to hospital top management.	0.6753
H05	Patient satisfaction data is regularly reported to all hospital staff.	0.6332
H06	Building an awareness of the importance of quality improvement among employees is an ongoing process.	0.4916
P18	Hospital quality of care data (clinical outcomes of care delivered) are monitored and are available.	0.4808
P20	Quality improvement data are available to managers and supervisors.	0.4548
P19	Data about the quality of non clinical areas are monitored and are available.	0.4094
P03	Internal data sources are used to evaluate quality of care.	0.4011

Table 7: Factor loadings: Process management/training

Item No.	Item description	Loading
L19	Training in universalist statistical techniques (such as histograms and control charts) is given.	0.6822
P01	Benchmarking is used as an integral part of the management of processes throughout the hospital.	0.5936
P04	External data sources are used to evaluate quality of care.	0.5845
P02	Statistical control charts are used to monitor processes throughout the hospital.	0.5781
L18	Quality-focused training is given to all hourly/non-supervisory hospital employees.	0.5191
P03	Internal data sources are used to evaluate quality of care.	0.4983
P05	Quality improvement activities often result in the redesign of existing processes.	0.4683
L17	Quality-focused training is given to all hospital managers and supervisors.	0.4512

Table 8: Factor loadings: Employee relations

Item No.	Item description	Loading
H08	Cross-departmental teams are utilized to evaluate hospital quality improvement or quality of care.	0.6747
H07	Quality improvement teams are utilized throughout the hospital.	0.6070
H10	Hourly/non-supervisory employees participate in quality improvement decisions.	0.5804
H11	Employees are recognized for superior quality improvement performance.	0.5631
H09	Feedback is provided to employees on their quality improvement performance or participation.	0.4865
L15	Top management creates an expectation that all employees will participate in quality-focused training.	0.4813
P05	Quality improvement activities often result in the redesign of existing processes.	0.4679

Table 9: Factor loadings: Training resources

Item No.	Item description	Loading
L16	Sufficient resources are available for employee training in the hospital.	0.6816
L17	Quality-focused training is given to all hospital managers and supervisors.	0.5071
L18	Quality-focused training is given to all hourly/non-supervisory hospital employees.	0.4282
L15	Top management creates an expectation that all employees will participate in quality-focused training.	0.4108

Factor 6-process management/training: Table 7 shows that all items loading on the sixth factor are split between two sets of items intended to measure two different dimensions of quality management practices: Training (L19, L18, L17) and process management (P01, P04, P02, P03, P05). Given that the training items loading on this factor represent those associated with the practical aspects of training, techniques that are required to manage processes, rather than a commitment of training resources, this factor can be labeled as representing a single process management/training dimension of quality management practices. This factor can be designated as focusing on the operational aspects of managing quality.

Factor 7-employee relations: Table 8 shows that the items loading on the seventh factor represent primarily items measuring the importance of employee relations in managing quality. This factor can be designated as focusing on the operational aspects of managing quality.

Factor 8-training resources: Table 9 shows that the items loading on the eighth factor represent four items measuring the role training plays in managing quality. In order to differentiate this factor from Factor 6 that also has loadings on training items, this item can more accurately be said to represent investment in training resources in the management of quality. This factor can be designated as focusing on the strategic aspects of managing quality.

The eight quality management factors found to be statistically significant in this study can be categorized into two groups-strategic management and operational management, as follows:

Strategic management factors:

- Role of management leadership
- Role of the physician
- Customer focus
- Training resources investment

Operational Management factors:

- Role of quality department
- Quality data/reporting
- Process management/training
- Employee relations

DISCUSSION

Based on the findings of this research, six of the factors of quality management found were consistent with those identified by existing quality management theory. The role of the quality department, the role of management leadership, quality data and reporting, the role of the physician, customer focus, employee relations are consistent, identifiable factors associated with the management of quality. This research challenges existing theory that conceptualizes process management and training as two distinct factors associated with the management of quality. It was found that two different factors, one factor associated with investment in training resources and another factor associated with a combination of process management and practical training should replace the process management and training factors. The implication of applying these findings is that training is a concept associated with two distinct processes. The first process is strategic and involves investing in training as a methodology for bringing quality management to the entire organization. Top management, responsible for the allocation of resources, must provide an adequate budget for the training required by quality management. The second process is operational and involves an acknowledgment that an integral part of process management is providing staff with the skills required to manage processes both with initial training and with retraining.

This research did not find support for applying the supplier quality management and the new service design factors of quality management to hospitals. With the supplier quality management factor, equipment and supplies fill a less critical role to the delivery of services in hospitals than they do in the making of products for manufacturing firms. Regarding the new service design factor, the methods used in hospitals are much different than those used in manufacturing firms. The implications of these findings may be that the two factors are not important to the management of quality in hospitals and should not be emphasized. Alternatively, two these factors may represent important aspects of quality management for hospitals that have not been adequately operationalized by the HQMP instrument.

CONCLUSION

As a result of this study, it was demonstrated that quality management practices could be assessed in the healthcare industry utilizing a valid and reliable instrument which was developed from a previous survey which measured business quality management practices. This contribution enables researchers to use similar methodologies to measure quality management practices in other industries. The specific HQMP instrument developed herein allows healthcare researchers to measure the quality management practices of hospitals across wider geographical regions and future time periods. The findings of this study add support for previous theory as to the underlying factors of quality management, refining those factors into two distinct categories: strategic management and operational management. By providing an instrument to measure specific quality management practices, this study can be used by practitioners to better focus quality management efforts by identifying the approach a particular organization has taken in adopting quality management practices. The implications of this study elucidates an understanding that the management of quality requires both a focus on longer-term strategic leadership, as well as day-to-day operational management. It is recommended that healthcare researchers and practitioners focus on the critical factors identified herein and employ this survey instrument to manage and better understand the nature of hospital quality management practices across wider geographical regions and over longer time periods. Furthermore, this study extends the scope of existing quality management literature to the healthcare industry throughout an entire state and contributes to theory about the nature of quality management practices.

REFERENCES

1. Sila, I., 2007. Examining the effects of contextual factors on TQM and performance through the lens of organizational theories: An empirical study. *J. Operat. Manage.*, 25: 1-83. DOI: 10.1016/j.jom.2006.02.003
2. Wayhan, V. and E. Balderson, 2007. TQM and financial performance: A research standard. *Total Qual. Manage. Bus. Excellence*, 18: 393-401. DOI: 10.1080/14783360701231658
3. Nair, A., 2006. Meta-analysis of the relationship between quality management practices and firm performance-implications for quality management theory development. *J. Operat. Manage.*, 24: 948-975. <http://ssrn.com/abstract=986207>

4. Saad, G. and S. Siha, 2000. Managing quality: Critical links and a contingency model. *Int. J. Operat. Prod. Manage.*, 20: 1146-1164. DOI: 10.1108/01443570010343717
5. Yasuhiro Monden, 1983. *Toyota Production System*. American Institute of Industrial Engineers, New York, ISBN: 0898060346, pp: 247.
6. Ahire, S.L. and K.C. O'Shaughnessy, 1998. The role of top management commitment in quality management: An empirical analysis of the auto parts industry. *Int. J. Qual. Sci.*, 3: 5-37. DOI: 10.1108/13598539810196868
7. Curkovic, S., S. Vickery and C. Droge, 2000. Quality-related action programs: Their impact on quality performance and firm performance. *Dec. Sci.*, 31: 885-905. DOI: 10.1111/j.1540-5915.2000.tb00947.x
8. Dobyns, L. and C. Crawford-Mason, 1991. *Quality or Else*. Boston. Houghton-Mifflin. <http://www.amazon.com/Quality-Else-Lloyd-Dobyns/dp/039563749X>
9. David A. Garvin, 1988. *Managing Quality: The Strategic and Competitive Edge*. Free Press, New York, ISBN: 0029113806, pp: 319.
10. Edwards W. Deming, 1986. *Out of the Crisis*. MIT Press, Cambridge, Mass, ISBN: 13: 978-0262541152.
11. Juran, J., 1981. Product quality-a prescription for the west. Part I: Training and improvement programs. *Manage. Rev.*, 70: 8-14. http://www.emeraldinsight.com/Insight/ViewContentServlet?Filename=/published/emeraldfulltextarticle/pdf/1760030101_ref.html
12. Juran, J., 1981. Product quality-a prescription for the west. Part II: Upper-management leadership and employee relations. *Manage. Rev.*, 70: 56-61. http://www.emeraldinsight.com/Insight/ViewContentServlet?Filename=/published/emeraldfulltextarticle/pdf/1760030101_ref.html
13. Howard S. Gitlow and Shelly J. Gitlow, 1987. *The Deming Guide to Quality and Competitive Position*. Prentice-Hall, Englewood, New Jersey, ISBN: 0131984411, pp: 247.
14. Juran, J., 1978. Japanese and western quality: A contrast in methods and results. *Manage. Rev.*, 67: 26-45. http://www.emeraldinsight.com/Insight/ViewContentServlet?Filename=/published/emeraldfulltextarticle/pdf/1760030101_ref.html
15. Phillip B. Crosby, 1979. *Quality is Free*. New American Library, New York, ISBN: 0451625854.
16. Armand V. Feigenbaum, 1983. *Total Quality Control: Engineering and Management*. McGraw-Hill, New York, ISBN: 0070203539, pp: 851.
17. Chase, R.B., R.F. Jacobs and N.J. Aquilano, 2008. *Operations Management*. McGraw-Hill. ISBN: 0390575348.
18. ISO., 2009. International organization for standardization. http://www.iso.org/iso/iso_catalogue/management_standards/iso_9000_iso_14000/qmp.htm
19. Frist, T., 1992. TQM at HCA. *Health Syst. Rev.*, 25: 15-17. <http://www.ncbi.nlm.nih.gov/pubmed/10117840>
20. Donabedian, A., 1992. The role of outcomes in quality assessment and assurance. *Qual. Rev. Bull.*, 18: 356-360. <http://www.ncbi.nlm.nih.gov/pubmed/1465293>
21. Berwick, D.M., 1989. Continuous improvement as an ideal in health care. *N. Engl. J. Med.*, 320: 53-56. <http://www.ncbi.nlm.nih.gov/pubmed/2909878>
22. Bader, B.S., 1992. Continuous quality improvement: Learning from the innovators. *Trustee*, 45: 4-6. <http://www.ncbi.nlm.nih.gov/pubmed/10117318>
23. Berwick, D.M., 1992. The clinical process and the quality process. *Qual. Manage. Health Care*, 1: 1-8. <http://www.ncbi.nlm.nih.gov/pubmed/10131641>
24. Berwick, D.M., B.A. Godfrey and J. Roessner, 1990. *Curing Health Care, New Strategies for Quality improvement*. Jossey-Bass, San Francisco. <http://www.josseybass.com/WileyCDA/WileyTitle/productCd-0787964522.html>
25. Gaucher, E.M. and R.J. Coffey, 1990. *Transforming Healthcare Organizations*. Jossey-Bass, San Francisco. <http://www.ecampus.com/book/9781555422509>
26. Laffel, G. and D. Blumenthal, 1989. The case for using industrial quality management science in health care organizations. *J. Am. Med. Assoc.*, 262: 2869-2873. <http://www.ncbi.nlm.nih.gov/pubmed/2810623>
27. McLaughlin, C.P. and A. D. Kaluzny, 1990. Total quality management in health: Making it work. *Health Care Manage. Rev.*, 15: 7-14. https://www.researchgate.net/publication/20950671_Total_quality_management_in_health_making_it_work
28. Merry, M.D., 1990. Total quality management for physicians: Translating the new paradigm. *Qual. Rev. Bull.*, 16: 101-105. <http://www.ncbi.nlm.nih.gov/pubmed/2111532>
29. Siler, J.F. and A. Garland, 1991. Sending health care into rehab. *Bus. Week*, 3237: 111-112. <http://www.businessweek.com/search/browstxt.htm>
30. Smith, J.L., 1992. TQM in hospitals. *Health Syst. Rev.*, 25: 24-29. http://www.find-health-articles.com/rec_pub_10117842-tqm-hospitals.htm

31. Weber, D.O., 1991. Pioneering quality in the intermountain west. *Health Care Forum*, 34: 54-60. http://www.find-health-articles.com/rec_pub_10114025-pioneering-quality-intermountain-west.htm
32. Atchison, T.A., 1992. TQM: The questionable movement? *Healthcare Financ. Manage.*, 46: 15-19. http://findarticles.com/p/articles/mi_m3257/is_n3_v46/ai_12073461/
33. Chorn, N.H., 1991. Total Quality management: Panacea or pitfall? *Int. J. Phys. Distrib. Logist. Manage.*, 21: 31-35. DOI: 10.1108/EUM00000000000402
34. McConnell, C.R., 1992. Quality: A watchword for the 1990s or the same old song? *Health Care Manager*, 10: 75-82. <http://www.ncbi.nlm.nih.gov/pubmed/10118941>
35. Alexander, J.A., B.J. Weiner and J. Griffith, 2006. Quality improvement and hospital financial performance. *J. Org. Behav.*, 27: 1003-1029. DOI: 10.1002/job.401
36. Gowen, C.R., K.L. Mcfadden, J.M. Hoobler and W.J. Tallon, 2006. Exploring the efficacy of healthcare quality practices, employee commitment and employee control. *J. Operat. Manage.*, 24: 765-778. <http://www.ncbi.nlm.nih.gov/pubmed/10114025>
37. Chesteen, S., B. Heigheim, T. Randall and D. Wardell, 2005. Comparing quality of care in non-profit and for-profit nursing homes: A process perspective. *J. Operat. Manage.*, 23: 229-242. DOI: 10.1016/j.jom.2004.08.004
38. Douglas, T.J. and W.Q. Judge, 2001. Total quality management implementation and competitive advantage: The role of structural control and exploration. *Acad. Manage. J.*, 44: 158-169. http://www.accessmylibrary.com/coms2/summary_0286-706817_ITM
39. Al-Marsumi, M., 2007. Total quality management in a chosen section of the hospitals in Amman, Jordan. *Qual. Manage. J.*, 14: 45-57. <http://www.asq.org/qic/display-item/index.pl?item=20883>
40. Sangüesa, M., R. Mateo and L. Izarbe, 2007. How hospitals choose a quality management system: Relevant criteria in large spanish hospitals. *Total Qual. Manage. Bus. Excellence*, 18: 613-630. DOI: 10.1080/14783360701349401
41. Kozak, M., T. Asunakutlu and B. Safran, 2007. TQM implementation at public hospitals: A study in Turkey. *Int. J. Prod. Qual. Manage.*, 2: 193-207. DOI: 10.1504/IJPMQ.2007.012410
42. Kunst, P. and J. Lemmink, 2000. Quality management and business performance in hospitals: A search for success parameters. *Total Qual. Manage.*, 11: 1123-1133. <http://bvs.insp.mx/articulos/2/10/05062001.pdf>
43. Saraph, J., G. Benson and R. Schroeder, 1989. An instrument for measuring the critical factors of quality management. *Dec. Sci.*, 20: 810-829. DOI: 10.1111/j.1540-5915.1989.tb01421.x
44. Bayraktar, E., E. Tatoglu, S. Zaim, 2008. An instrument for measuring the critical factors of TQM in Turkish higher education. *Total Qual. Manage. Bus. Excellence*, 19: 551-574. DOI: 10.1080/14783360802023921
45. Quazi, H., J. Jemangin, L. Wai Kit and C.L. Kian, 1998. Critical factors in quality management and guidelines for self-assessment: The case of Singapore. *Total Qual. Manage.*, 9: 35-55. DOI: 10.1080/0954412989252
46. Martinez-Lorente, A., A. Gallego-Rodriguez and B. Dale, 1998. Total quality management and company characteristics: An examination. *Qual. Manage. J.*, 5: 59-71. <http://www.asq.org/qic/display-item/index.pl?item=12150>
47. Madu, K. and C. Kuei, 1995. Managers' perceptions of factors associated with quality dimensions for the different types of firms. *Qual. Manage. J.*, 2: 67-80. <http://www.asq.org/qic/display-item/index.html?item=12068>
48. Madu, K., C. Kuei and C. Lin, 1995. A comparative analysis of quality practice in manufacturing firms in the US and Taiwan. *Dec. Sci.*, 26: 621-635. DOI: 10.1111/j.1540-5915.1995.tb01443.x
49. Badri, M. A, D. Davis and D. Davis, 1995. A study of measuring the critical factors of quality management. *Int. J. Qual. Reliabil. Manage.*, 12: 36-53. DOI: 10.1108/02656719510080604
50. Dillman, D.A., 1978. *Mail and Telephone Surveys: The Total Design Method*. Wiley, New York. <http://www.getcited.org/cits/PP/1/PUB/101856469>
51. Jim Nunnally, 1967. *Psychometric Theory*. McGraw-Hill, New York. ISBN: 9780070474659
52. Hair, J.F., R.E. Anderson, R.L. Tatham and W.C. Black, 1992. *Multivariate Data Analysis with Readings*. 3rd Edn., Macmillan Publishing Company, New York, ISBN: 0023490209, pp: 757.