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ORIGINAL RESEARCH

The Impact of Hospital Demographic Factors on Total Quality Management Implementation: A Case Study of UAE Hospitals

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Abstract

Aim: Maintaining service quality and value using quality and management tools is crucial in any organization. In essence, improving service quality boosts both efficiency of organizations and consumer pleasure. The deployment of quality development programs such as Total Quality Management (TQM) is one technique that businesses may employ to deliver exceptional customer service**.** The health sector, in particular, is one of the industries that require TQM adoption due to its complexity and the need for constant service improvement. TQM helps to improve service quality in health facilities through advanced clinical and administrative procedures. This research comprehensively assesses TQM levels and the impact of hospital demographics on its implementation process in hospitals in the United Arab Emirates (UAE).

Methods: The study used a quantitative research strategy based on a survey study design. Questionnaires were used to gather primary data from respondents deployed a self-administered technique. 1850 questionnaires were delivered to the hospital's senior staff based on their number in each hospital. Of the 1850 questionnaires distributed, 1238 usable questionnaires were analyzed, yielding a response rate of 66.9%. The study used a binary logistic regression model to determine if hospital demographics affected TQM implementation. The study data were examined and analysed using version 25.0 of the SPSS software.

Results: The results show that most of the health facilities with an overall TQM between 4.12 and 4.82 were utilized, governmental, accredited and utilized and large hospitals, while the hospitals with a mean between 2.91 and 3.45 were small, unaccredited private, and non-specialised. Thus, large hospitals have a higher TQM utilization rate than small hospitals. In addition, the findings of the t-test revealed that a high TQM is represented by means of 4.68, 4.67, 4.43, and 4.12 for accredited, utilized, governmental and large hospitals. The binary regression analysis also reveals similar results: large, governmental, utilized and accredited hospitals have greater chances of TQM adoption than other categories of hospitals (Exp (B): 1.2; 95%CI: 1.001 – 1.421, P< .05); (Exp (B): 1.3; 95%CI: 1.012 – 1.721, P< .05); (Exp (B): 1.5; 95%CI: 1.127 – 2.051, P< .01); and (Exp

(B): 1.5; 95%CI: 1.102 – 2.012, P< .05); correspondingly. Another observation from the results is that hospitals that implemented technological tools had a greater chance of successfully executing the TQM program than hospitals that did not utilize advanced technologies due to the limited availability of resources (Exp (B): 1.7; 95%CI: 1.332 – 2.187, P< .01).

Conclusion: Even though health facilities need to adopt TQM, its implementation depends on the hospital size and demographics that significantly influence the adoption of TQM programs. However, this study will help bridge the current gap on the usage of TQM in the health context by examine the influence of demographic factors on adopting TQM in hospitals. Hence, provide adequate information to help the UAE hospital administrators appropriately execute the TQM program in the hospitals and enhance the efficacy of their operations.

Keywords: Total Quality Management, Quality Improvement Strategy, Hospital Service Quality, Hospital Size, Hospital Demographic Factors, Binary Logical Regression Model.

Conflict of interest: None declared.

Introduction

Healthcare system quality has become a major societal concern, as pointed out in several reports such as 'The State of Health Care Quality', and 'To Err is Human: Building a Safer Health System' (1,2). On the contrary, studies (1-4) based on the Institute of Medicine (IOM) report indicate that the absence of quality care leads to human error, which causes around 98,000 deaths yearly. Another factor that raises the mortality rate is unnecessary hospital admissions, responsible for as many as 81,000 deaths and 3.6 billion USD in yearly expenditures. Also, Johns Hopkins University School of Medicine conducted research on a similar issue in 2016 and discovered that over 250,000 Americans die annually due to avoidable medical mistakes (5). However, Aburayya et al. (1,2) also reported that if the entire healthcare system provided quality services, especially Total Quality Management (TQM), many of these deaths and expenses could be avoided. TQM helps minimise the number of future medical error-related fatalities by streamlining the hospital processes and operations.

The application of TQM in the healthcare context has followed the effective trial studies which showed that the model could work in the healthcare. The National Demonstration Project on Quality Improvement in Healthcare (NDPQIH) which has approximately 20 specialists on healthcare from diverse establishments detailed that the TQM strategy could be practically applied in the healthcare setting (6,7). Likewise, TQM was also found to have the power to improve patient satisfaction, reduce medical mistakes, and increase the safety of patients (8). Furthermore, Lashgari et al. (9) agreed that the TQM model improved customer experience, staff morale, and productivity in various industries.

The implementation of comprehensive management programs such as TQM is dependent on several factors such as the size of the organisation, organization's type (Government or private), organization's accreditation profile, organization's functionality (specialised and non specialised), and technology adoption (1,2,8,10-15). However, several studies (8,13,14,16) indicate that smaller businesses find it more difficult to develop due to the lack of adequate resources, inability to reach suppliers, ineffective leadership, insufficient analytical tools and the inability to track and adjust to their processes. This is proven by other results from the above studies, which reveal that TQM approaches were first utilised in major and large companies in Japan and the United States. As a result, research indicates the importance of attaining specific standards and necessities to gain the ability to integrate TQM into their operations among small organisations (13). Moreover, study (17) notes that the deployment of TQM in small and large companies is different as the former is less formal and more absorbed by people, while the latter is based on certain procedures. On the converse, Sila (18) offers a contradicting opinion that TQM execution in both small and large firms shows no significant difference. Thus, more research is required on how factors such as size determine TQM implementation in several organisations.

Attitude towards quality has also been a huge determinant in TQM. For example, considerable researchers (1, 2, 7) have reported that private companies value TQM implementation compared to government organisations. In contrast, large organisations tend to invest significantly more in training and education to encourage the adoption of TQM processes. Studies (1, 8, 10,14) support the above research by showing that TQM approaches have greater importance and can be more easily implemented in firms that have earned quality accreditation. The companies also ought to have embraced

technology as the process requires adequate resources, which many small companies with no specialisation lack.

The impact of size or scale on quality has dominated the research for a long time, following the desire to improve patient outcomes through TQM. Numerous studies (1, 10, 19) report a significant relationship between a hospital's size and its capacity to deliver high-quality medical treatment. The quality of services a hospital supply depends on its size, kind, and operation. This is due to the high level of collaboration in large hospitals. Studies (20-23) explains that closeness and teamwork facilitate collaboration, eventually increasing the quality of services delivered. Also, the health facilities can integrate various digital solutions into their processes to improve health outcomes. For instance, accredited hospitals have adequate resources to afford an Electronic Medical Record system (EMR), which helps the health providers to pursue advanced quality improvement programs and interventions (21-23).

There exists insufficient research on the TQM adoption in the UAE. Specifically, a literature search has revealed that the demographic parameters associated with the successful implementation of TQM in UAE hospitals were under-discussed (2). Thus, following insufficient research on the topic, this study will help bridge the gap and provide adequate information to help the UAE hospital administrators and healthcare providers appropriately execute the TQM program in the hospitals. The research is also committed to determining the effect of such traits and variables on the level of medical care delivered by UAE hospitals in terms of patient outcomes. In addition, the healthcare industry needs to investigate the connection between the demographic features of hospitals and the implementation of TQM. This will help locate suitable strategies for utilising the approach because previous attempts (1-2, 6-8,24-26) have examined the application of TQM in the medical business and have presented no adequate answers to the many implementation issues.

Another aim is to fill the gap that most studies have discovered on the lack of understanding of the implementation of TQM in the Gulfstream area, notably in the UAE (1,2,10,26-28). As a result, the research explores TQM using scientific and practical ways to compensate for this deficit. This is the first research of its type to look into the TQM adoption rate and level in UAE health facilities (UAE). According to this study, TQM deployment in hospitals is linked to the demographic features of hospitals, which is achieved through research aims and current literature in assembling the findings. TQM implementation level was also evaluated for its efficacy in addition to this. After providing sufficient information on the topic, the health experts can use the findings and suggestions of this study to implement better hospital quality management standards in UAE hospitals. As a result, the study is committed to investigating the TQM level in the UAE hospitals, considering the opinions of executive hospital staff. Another method of how the study plans to fill the research gap is by examining whether the hospital size and demographic differences affect TQM being used in those facilities.

Methods and Materials

The research looked at how hospital size and demographic characteristics affected the adoption of TQM in UAE health facilities using quantitative research and survey techniques. The primary data were derived from respondents who self-reported and responded to surveys they supplied to themselves. All administrative and clinical hospital directors in Dubai make up the sample unit or the staff, which is a great source of knowledge about quality procedures (29). The study was carried out in

Dubai between October 15, 2019, and February 12, 2020, covering hospitals in the UAE. Convenience sampling was used in this study since it was challenging to get a sample frame list from these organisations. According to (30), convenience sampling is the most suitable for this study because it can cut costs and time involved in the research process and gives quick access to the right sample size. Additionally, the sampling method is frequently used for research since it is convenient, cheap and can access large data (30). For instance, this study utilised a larger sample size to lower the chances of committing errors associated with the type of sampling. Employing a huge sample in the research also helped boost the accurateness and predictive validity of the sampling findings. Likewise, with a 95% confidence level and a margin of error of 5%, the RaoSoft sample size calculator used in the research managed to generate 975 samples. For this investigation, hospital administrators received 1,850 questionnaires. Out of the 1,850 questionnaires distributed, 1,238 valid surveys were returned, yielding a response rate of 66.9%.

Furthermore, the research led to the creation of exceptional items of TQM building measurement instruments. Thirty-two different items were used to computing TQM elements published in various studies (1,2,6,8,17). This study utilised a five-point Likert scale to record people's views, with one point meaning "strongly disagree" and five points denoting "strongly agree". The contents of the questionnaire included (1) socio-demographic characteristics (7 items), such as age, gender, hospital size, hospital type, hospital accreditation profile, hospital functionality, technology adoption; (2) perceived factors affecting the implementation of TQM (32 items). Checkboxes serve as symbols for different answers to the closed-ended questions for the study. Questions related to socio-demographic characteristics were treated as categorical variables. Questions related to main factors affecting the implementation of TQM treated as continuous variables. The researcher asked the participants to express their views and opinions on whether they agreed or disagreed with the statements they were provided with. A study conducted by Diamond and Jefferies (31) shows that a five-point Likert scale's extension is divided by the sum of scale points to determine the length of the scale. As a result, the extension of each scale is calculated in this investigation by subtracting five from one to get four, then dividing the total length of each scale by four to get 0.80. Consequently, 0.8 was added to each scale code which resulted in adopting 3.41 as threshold for identifying factors affecting the success implementation of TQM.

In order to compare the means of two groups for a similar variable, the study employed an independent t-test for the groups. This enabled the researchers to determine whether there were significant differences between the TQM components in various hospital types. Furthermore, the study used a binary logistic regression model to determine if hospital demographics affected the chance that TQM deployment would have an impact. The study data were examined and analysed using version 25.0 of the SPSS software.

Results

Participants and Hospitals Profile

Table 1 displays the features of the participants in the study. In this research, 1,238 participants participated, where 58% were men and 42% were women. Additionally, two-thirds of the sample belonged to the designated age ranges; 30- 39 and 40-49, who reported 65%, equivalent to two-thirds of the sample. Three of the six hospitals that comprise this study's sample are large, operated by the government, specialised, accredited by Joint Commission

International (JCI), and equipped with cutting-edge technology. Of the 1238 respondents, 76% (945) worked for large hospitals, whereas 293 (24%) worked for smaller ones. Additionally, more than two-thirds of the respondents worked for government or institutions in different specialisations. Regarding hospital accreditation and technology adoption, 80% of respondents who worked in accredited hospitals stated their facilities regularly employ various technological tools effectively.

Table 1. The Characteristics of respondents

Demographic Factors	Frequency	Percent (%)
Gender		
Male	724	58
Female	514	42
Age		
20-29	138	11
30-39	412	34
40-49	388	31
Over 50	300	24
Hospital Size		
Large	945	76
Small	293	24
Hospital Type		
Government	854	69
Private	384	31
Hospital Functionality		
Specialised	799	65
Non-Specialised	439	35
Accreditation Certification		
Yes	1002	81
No	236	19
Technology Adoption		
Yes	998	80
No	240	20

Hospitals' Demographic Factors and Overall TQM Implementation

In this study, eight TQM elements were identified. The researcher deals with each of these elements together to determine the level of overall TQM implementation in the targeted hospitals. Findings from Table 2 show that a mean TQM implementation score of 4.82 was recorded in most hospitals that effectively employ diverse technical solutions, which positions them at the top of the list. In addition, the overall averages of 4.68, 4.67, 4.43, and 4.12 imply that accredited, specialist, government and large hospitals implemented TQM at a greater rate than small, private, non-accredited, and non-specialised hospitals. At the .05 levels of significance, the t-test demonstrates a

significant difference between the small hospital's mean TQM implementation and the large hospital's mean TQM implementation, suggesting large discrepancies between accredited, specialist, government, and technology-adopted hospitals and the means of other types of hospitals. Consequently, it is realistic to anticipate that TQM adoption in large, accredited, government-specialised, and technology-adopted hospitals is substantially greater than in hospitals of other categories.

The link between sample demographics and hospital TQM implementation was evaluated utilising multivariate research applying binary logistic regression analysis. There is a link between hospital size and successful TQM adoption, as evidenced by the multivariate data given in Table 2 results. The findings imply that large hospitals were more likely than small hospitals to have a substantial degree of TQM application (Exp (B): 1.2; 95 percent CI: 1.001 - 1.421, P 0.05). The type of hospital has also been proven to be a significant factor in adopting TQM in health facilities. Government hospitals have greater chances of utilising TQM extensively (Exp (B): 1.3; 95 percent CI: 1.012 - 1.721, P 0.05). It is also considered that hospital functionality affects TQM adoption. Furthermore, TQM use is stronger in specialised hospitals than in non-specialist hospitals (Exp (B): 1.5; 95 percent CI: 1.127 - 2.051, P.01), while the hospital's accreditation profile greatly influences TQM adoption, as illustrated in Table 2. The results reveal that hospitals with quality accreditation certificates have a higher ability to adopt TQM than non-accredited hospitals (Exp (B): 1.5; 95 percent CI: 1.102 - 2.012, P 0.05). Moreover, hospitals that possessed the ability to utilise the digital tools successfully had a greater chance twice in adopting the TQM models (Exp (B): 1.7; 95 percent CI: 1.332 - 2.187; P.01). Thus, the results confirm the proposition that the demographic aspects and size of the hospital considerably affect the TQM implementation's efficacy.

Table 2. T-Independent Test &Logistic Regression Analysis of Factors Predicting the Overall TQM Implementation among Hospitals

Demographic Factors	Overall TQM	t-Test	*P-Value*	Exp (B)	95.0% C.I. for EXP(B)	*P*
Hospital Size						
Large	4.12			Ref (1.00)	1.001 - 1.421	***P<.05***
Small	3.45	1.654	*.021**	1.194*		
Hospital Type						
Government	4.43			Ref (1.00)	1.012 - 1.721	***P<.05***
Private	3.34	1.801	*.013**	1.326*		
Functionality						
Specialised	4.67				1.127	

Non-Specialised	3.07	1.986	*.002***	Ref (1.00) 1.521**	- 2.051	***P<.01***
Accreditation						
Yes	4.68			Ref (1.00)	1.102	
No	3.11	1.889	*.007***	1.505*	- 2.012	***P<.05***
Technology Adoption						
Yes	4.82			Ref (1.00)	1.332	
No	2.91	2.954	*.000****	1.657**	- 2.187	***P<.01***

Note: *p<0.05; **p<0.01; ***p<0.001.

Discussion and Conclusion

This study investigates senior hospital personnel's perspectives on adopting and implementing TQM in the healthcare industry. According to the results of multiple regression analysis, TQM has a large and beneficial effect on the quality of hospital service. The research also evaluated the link between hospital demographic characteristics and TQM implementation in different hospitals in Dubai and the influence of hospital size, hospital type, hospital functioning, accreditation profile, and technology adoption on TQM implementation in healthcare. According to the study findings, large, government, specialist, accredited, and technology-adopting hospitals in the UAE had a comparatively high degree of TQM adoption compared to the smaller heath facilities. Consequently, hospitals in the UAE became aware of the advantages and aims of implementing TQM to boost the value of services. Also, the results, which have also been consistent with previous research (1, 2, 7, 10), confirm that the administration of these hospitals also supports the value of TQM in boosting patient satisfaction and institutional performance. However, the results of this research are in agreement with a considerable body of past studies.

The study contained a significant variance in the mean of TQM components between small and large hospitals at the .05 significance level, with large hospitals implementing TQM more successfully. Correspondingly, Elfaituri's study (13) further confirms that when successful management methods become mainstream, large organisations are often the first to embrace them. On the other hand, studies (8, 16, 17) indicate that small enterprises deal with a lack of information infrastructure, insufficient leadership, and supplier concerns, among other barriers. In addition, the absence of statistical tools and process control is still a huge barrier to TQM implementation among small enterprises, and numerous studies continue to prove that the adoption of TQM in government and accredited hospitals is much larger than in private and non-certified facilities. Accreditation of a government hospital confirms that its performance fulfils nationally established criteria based on government rules. Moreover, many hospitals have their assessment and self-improvement process, which, ideally, leads to adherence to the standard of care and improved results.

Seelbach et al. (32) conducted a study on quality management to examine whether Joint Commission hospital accreditation had an impact on patient outcomes compared to health facilities with other accreditation. The researchers discovered that large facilities inspire better trust among the general public, indicating higher client satisfaction. The findings further showed that specialized and technologically equipped hospitals are among those that apply TQM management efficiently. The study confirms studies' (1,8,10,17) that hospitals with high levels of specialization and technology usage invest much more in management leadership, training, and education to support TQM implementation than hospitals with low specialization and technology adoption. Studies (1,6-9,17,21) added that these hospitals majorly focus on comparing their TQM processes and have greater operation-quality relationships than hospitals with lesser specialism and technology usage. Thus, hospital functioning corresponds with the quality of care services (8,11,17,24). The teamwork ability, closeness and employing various tools or technology, such as an EMR system, according to Almarzouqi et al. (20) and Hamadneh et al. (33), allow cooperation, which increases the quality of services delivered. The results from the studies show that hospitals that employ various technological tools enable interdepartmental communication, which facilitates the collaboration of healthcare workers to give superior patient care. The research, among other studies examined in the study, confirms the claim that TQM improves services in the health care system. In addition, this study primarily integrates the perspectives of senior staff members, which were gathered mostly through a questionnaire. Future studies should address the subjectivity of this data collection by employing data triangulation techniques such as interviews or observations with hospital management (34,35).

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