



Resilience Status of Hospital Service Quality According to the World Health Organization Evaluation

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Abstract

Introduction: Ensuring and maintaining the health of the population is one of the most important programs in any country. Those involved in this field strive to provide quality services to society under all conditions, including times of crisis and epidemic. This study examined the resilience status of the hospital services quality based on six building blocks evaluation by World Health Organization.

Methods: This study used a quantitative method from the beginning of 2020 to the end of 2021. The sample of the study was purposefully composed of 50 senior and middle managers of Shiraz Medical Hospitals who were continuously providing services during the COVID-19 pandemic. A researcher-developed questionnaire in the field of Six building blocks was used to collect the data, and SPSS software version 21 was used for data analysis.

Results: Hospital service quality resilience generally showed that, with a mean and standard deviation of $68.51 \pm 8.53\%$, the extent of access to medicines and medical equipment (79.50 ± 16.12) and the extent of financing (60.42 ± 16.01) were the highest and lowest.

Conclusion: The quality of hospital services is considered an indicator of governance during the COVID-19 pandemic. Despite many efforts in this area, the assessments reveal that most hospitals in the country face many problems and unfavorable conditions. To ensure resilience and better healthcare outcomes in future crises, managers should also prioritize communication and collaboration with other healthcare facilities and provide medications and medical equipment for better response during pandemics. Also, comprehensive hospital preparedness must be a top priority for policymakers and healthcare managers.

Keywords: Quality resilience, Hospital services, Six building blocks, Covid-19 virus

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Introduction

Providing and maintaining the health of people is one of the most important programs of the health and treatment system of any country and is one of the development priorities. Stakeholders strive to use the resources available to provide quality healthcare and treatment in all situations, even during crises and epidemics (1). In the health system, hospitals, as the main centers of health-care, play an important role in achieving the goals of the health sector, whose main mission is to provide quality care in each country (2).

Quality health services must have the characteristics of accessibility when needed,

safety, efficiency, accuracy in the use of diagnostic and therapeutic services, and effectiveness of treatment in all conditions (3). Using quality services by eliminating re-work and wasting resources will save the costs, increase patient satisfaction and loyalty, improve staff morale, and enhance patients' and staff's safety (4-6).

The World Health Organization defines quality in terms of effectiveness, price, social acceptability and accountability, and emphasizes the importance of the quality and continuity of healthcare (7). Continuity of quality services refers to the quality of services resilience; that is, hospitals can have the best response and performance in providing quality health services

in stressful and unfortunate situations as normal conditions (8).

One of the unfortunate situations is the COVID-19 epidemic, which appeared with a high transmission rate and spread rapidly, confronting all countries of the world with huge health and medical challenges (9), even increasing the number of cases and saturating the capacity of health systems. Ultimately, this has led to high mortality rates worldwide (10, 11). Disinfection of the hospital environment and inadequate control of the cut and chain have disrupted the provision of quality services (12).

Hospitals must be resilient in providing optimal care to deal with the challenges and adverse conditions of COVID-19 pandemic (13) and respond to crises in a timely and prepared manner by providing preparedness, planning, and flexibility (14). Prompt and timely referral plays a critical role in reducing mortality and saving patients (15). Evaluation of their performance is important. One of the methods of performance evaluation based on the Six building framework of health systems is the World Health Organization, which evaluates the health systems in terms of service delivery, manpower, information systems, and access to essential drugs, medical care, financial resources, leadership, and governance (16).

At the beginning of the epidemic, most hospitals in the country were disrupted due to the lack of preparedness, followed by an increase in the number of patients and prolongation of the pandemic, with capacity saturation, which disrupted the care process and increased mortality in these conditions to improve the patients' performance. There are many resilience assessments that can identify vulnerabilities, strengths, weaknesses and plans to improve hospital performance in the face of epidemic crises (15, 17).

The effective factors on the resilience of hospitals in the study showed that training management, resource capability, equipment, and organizational structure have been identified (18). Another study in Iran identified factors such as communication and information technology system, training and equipment and its elements, equipment, response, coordination and transport system as dimensions affecting hospital resilience. (19).

It is necessary to study the resilience of the

quality of services in the hospitals in the country because Shiraz University of Medical Sciences is one of the type one universities in the country and even in the world and has various teaching and specialized hospitals equipped with modern diagnostic and treatment equipment and experienced professors and doctors (20). Also, it has an organ transplant treatment centre, which is the first and largest centre in Iran and the third transplant centre in the world after the United States and Spain; it provides services to a large number of patients in need of transplantation in the country and even the Middle East, so measuring and analyzing their resilience is important.

The present study aimed to investigate, for the first time in Iran, the resilience of the quality of hospital services under epidemic conditions in teaching hospitals in Shiraz; the policymakers and health system managers in similar conditions can use the results of this study in hospital planning and preparation.

Methods

Study Design

This is a quantitative study at Shiraz Medical Sciences Hospital in 2020-2021.

Study Population

A purposive sampling method was used to select the participants. From the 70 senior and middle managers in ten hospitals affiliated to Shiraz University of Medical Sciences, the sample size was estimated 59 subjects by using Morgan's table (21), but due to the lack of permission from the hospital manager for the researcher to enter the hospital, and also the unwillingness of some sample members to participate in the research due to COVID-19 virus, only 50 people were selected for the study. Under the conditions and restrictions of COVID-19, administrators allowed limited sampling to ensure staff safety and reduce traffic problems at hospitals. First, the hospital management was contacted and, if they agreed, information was collected.

Inclusion Criteria

- Infection control supervisors, quality improvement managers, training supervisors, patient safety coordinators, human resource managers, hospital managers, and nursing managers were selected.

- Individuals who had direct experience of providing ongoing services in the context of the COVID-19 crisis.

- Individuals who were willing to participate in the research

Exclusion criteria

- Lack of permission from the hospital management

- to participate in the study

Setting and Data Collection

A researcher-designed questionnaire was used to assess the resilience status of hospital service quality. The questionnaire was designed into three parts. The first part included information on the characteristics of hospitals with four questions (type of hospital specialty, identification of non-clinical and clinical participants, number of active beds, and number of nurses). By consulting experts and studying articles (22), the research team came to the conclusion that these characteristics can be effective on the resilience of hospital service quality.

The second part of the questions on the continuity of hospital services quality, based on the Six building framework for health system evaluation, has 47 questions in six dimension, including service delivery (questions 1 to 17), workforce dimension (questions 18 to 21), access to medicines and medical care (questions 22 to 25), financing dimension (questions 26 to 32), governance and leadership dimension (questions 33 to 43) and health information system dimension (questions 44 to 47), with the option of answering no, to some extent, and yes.

The third part, including the status of indicators of hospital service quality, was designed with 25 indicators. The list of indicators was prepared by the research team. In a focused group meeting, 4 members of the Faculty of Health Care Management with research experience in the field of quality and resilience were appointed. The experts' suggestions and corrections were applied to the list of indicators, and finally 25 final indicators were selected.

The content validity of the questionnaire was assessed by 12 experts in healthcare management, disaster health, health policy, hospital managers, nursing managers, and quality improvement managers. To determine the content validity ratio (CVR), we gave the questionnaire to the experts

and they were asked to rate each question on a three-point scale: "not necessary, useful but not necessary, or necessary". Acceptance of questions was based on Laoche (23), and questions with a content validity ratio greater than 56% were accepted.

The reliability of the questionnaire was tested using Cronbach's alpha coefficient, which ranged from 0.82 to 0.92. This indicated the reliability of the questionnaire (Table 1).

Table 1: Reliability of the questionnaire according to the resilience dimensions of hospital service quality

Dimensions	Cronbach's alpha coefficient
Service delivery	0.92
Human resource	0.85
Access to medicine and medical care	0.91
Financial security	0.82
Management and leadership	0.89
Information system	0.87

In order to collect the information, we first coordinated the time schedule with the participants; then, the questionnaire was completed in a face-to-face meeting with questions from them. Simultaneously, the ambiguities were explained to the participants to better understand the questions, and by referring to the quality improvement or statistical unit of the hospital, the information on the performance indicators of the hospitals before and after COVID-19 was received, and the performance of the hospitals was compared over two years.

Data Analysis

The data collected were entered into SPSS software version 21 and analyzed. The normality of the data was first checked using the Kolmogorov-Smirnov test with a significance level of $P=17.17$. The independent T-test was used to determine the hospital services quality resilience, and the Mann-Whitney test was used to compare the indicators.

Results

The results showed that 72% of the participants were female and 28% were male. Their mean age was 41.48 ± 6.18 and work experience was $18.72 \pm 23.8.23$ years. 20% of the research participants were hospital managers, 20% were quality improvement officers or secretary of hospital executive management committee, 20%

were nursing managers, and 40% were hospital ward managers and supervisors.

Table 2 shows that the resilience status of service quality in Shiraz medical hospitals using t-test was 68.51%, and the highest mean resilience of hospital service quality was related to the dimension of access to medicine and medical care (79.50 ± 16.12); also, the lowest value was related to the financing dimension (60.42 ± 16.01).

Table 2: Service Quality Compatibility Status in Shiraz Medical Hospitals

Dimensions	Standard Deviation± Mean to Percent
Service delivery	69.59±14.21
Human resource	77.80±12.66
Access to medicine and medical care	79.50±16.12
Financial security	60.42±16.01
Management and leadership	62.23±11.82
Information system	73.40±11.17
The average of the total quality of hospital services	68.51±8.53

Table 3 shows that there was no significant difference ($P > 0.05$) in the resilience dimensions of hospital service quality between clinical and non-clinical participants. The mean and standard deviation of hospital service quality were $66.81 \pm 8.69\%$ for clinical participants and $71.07 \pm 7.80\%$ for non-clinical participants.

Table 4 shows that there was no statistically significant difference between the performance indicators of hospitals based on COVID-19 and non-COVID -19 patient care centers and the performance indicators of hospitals before and after COVID-19; moreover, the percentage of nosocomial infection rates was 3.76 ± 1.17 , satisfaction of staff 57.98 ± 4.41 , the patients' satisfaction 77.54 ± 5.15 , patients' homework within 12 hours was 85.80 ± 7.35 , and the shortage of nursing staff was 12.63 ± 9.62 .

Discussion

The present study examined the resilience status

of service quality in Shiraz teaching hospitals during the COVID-19 epidemic based on the Six building blocks framework of the WHO Health Systems Assessment in the dimensions of service delivery, human resources, information systems, access to essential drugs and medical care, financial resources, leadership, and governance.

The results of the present study showed that the quality-of-service status of Shiraz medical hospitals with a mean and standard deviation of $68.51 \pm 8.53\%$ and the quality of service between non-clinical participants' point of view (71.07 ± 7.80) with clinical participants' point of view (66.81 ± 8.69). The difference was not statistically significant ($P = 0.08$). Consistent with the results of this study, Narwal et al. in India showed reduced access to essential medical services, lack of facilities and infrastructure for triage, lack of isolated wards and hospital beds, delayed care and patient safety, and quality of hospital care. The length of the epidemic (24) also showed that delayed action to control COVID-19 virus disease led to unpleasant accidents and a decline in the quality of hospital care (25).

In the present study, the quality-of-service delivery, with a mean and standard deviation of $69.59 \pm 14.21\%$, and the challenges of slow patient allocation, long waiting times and increased numbers of patients were observed. Nosocomial infections were also observed. In addition, Douglas et al. in Nigeria found that the unpreparedness of hospitals or lack of facilities to deal with the epidemic reduced the quality of services (26). The findings of a study by Gonijal et al. (27) are consistent with the results of the present study.

The present study showed that the equipment required for neurological surgeries in Shiraz had only one hospital, which was designated as a hospital for COVID-19 virus patients and caused a lack of access to services for patients with brain

Table 3: Status of the quality of hospital services from the perspective of the participants

Dimensions	Non-Clinical participants	Clinical participants	sig
	Standard Deviation±Mean to Percent	Standard Deviation±Mean to Percent	
Service delivery	72.04±12.64	67.95±15.15	0.32
Human resource	79.50±11.90	76.66±13.21	0.44
Access to medicine and medical care	83.75±13.51	76.66±17.28	0.12
Financial security	64.64±13.80	57.61±16.97	0.13
Management and leadership	64.23±11.97	60.89±11.73	0.33
Information system	75±10.51	72.33±11.65	0.41
The average of the total quality of hospital services	71.07±7.80	66.81±8.69	0.08

Table 4: Comparison of performance indicators of hospitals by service center for COVID-19 and non-COVID -19 patients and before and after COVID-19

Variable	Hospitalization center for covid-19 patients	Hospitalization center for Non covid-19 patients	P value	Standard Deviation±Mean to Percent		P value
	Standard Deviation±Mean	Standard Deviation±Mean		2018 (before of covid-19)	2020 (after of covid-19)	
Percentage of bed occupancy	58±57	72.80±7.80	0.13	76.39±14.34	67.57±16.45	0.23
Average patient length of stay by day	3.35±0.22	6.71±1.69	0.11	5.77±3.22	5.45±3.35	0.84
Duration of level 1 triage	2.72±0.92	2.20±0.37	0.64	2.63±1.23	2.39±0.38	0.86
Duration of level 2 triage	6.33±2.90	8.44±4.01	0.68	8.50±2.93	7.65±2.61	0.83
Duration of level 3 triage	8±2.26	14.05±7.21	0.46	10.53±3.15	11.87±4.53	0.82
Duration of level 4 triage	8.74±1.51	23.20±15.14	0.39	12.50±3.39	17.78±9.441	0.61
Duration of level 5 triage	7.67±3.18	23.60±15.59	0.36	12.25±3.63	17.63±9.82	0.62
Net mortality rate	7.45±4.40	6.10±2.90	0.81	6.63±1.83	6.60±2.27	0.99
Gross mortality rate	4.69±0.21	7.60±3.46	0.44	7.60±2.05	6.77±2.45	0.79
Percentage of maternal mortality	7.32±7.29	0.01±0.01	0.42	0	2.75±2.73	0.34
Percentage of personnel death due to corona	0	0.05	0.37	0	0.03±0.03	0.35
Percentage of hospital infection	2.12±1.26	4.75±1.64	0.25	3.29±1.05	3.76±1.17	0.76
Percentage of assignment of patients under 6 hours	92.75±1.51	91.73±5.56	0.86	94.56±3.61	92.11±3.37	0.62
Percentage of assignment of patients under 12 hours	81.48±13.41	88.40±9.64	0.69	98.49±1.35	85.80±7.35	0.13
Percentage of staff satisfaction	57.95±9.95	58±7	.99	63.41±3.19	57.98±4.41	0.34
Percentage of patient satisfaction	67.13±11.87	82.75±3.98	.39	78.81±3.36	77.54±5.15	0.84
Number of dead morgues	3.67±2.66	2.80±1.39	.79	3.13±1.21	3.13±1.21	1
Percentage of patients falling	.03±0.02	2.04±1.02	0.12	0.53±0.36	1.28±0.71	0.37
Percentage of bed sores	0.28±0.01	0.21±0.12	.65	0.20±0.06	0.23±0.08	0.81
Percentage of medication error	0.02±0.01	4.33±2.04	0.10	3.26±2.20	2.72±1.45	0.84
Percentage of medical error	2.53±2.39	6.41±2.55	0.31	3.06±1.33	4.95±1.86	0.42
Percent of failed CPR	48.69±25.27	38.28±21.33	0.68	52.39±12.58	39.68±15.42	0.53
Percentage of surgery cancellation	10.86±7.08	5.45±3.03	0.53	6.81±2.51	7.48±3.10	0.86
Percentage of voluntary discharge from hospital	8.90±2.15	8.82±2.59	0.98	6.90±1.86	8.85±10.70	0.45
Percentage of voluntary discharge from the emergency room	5.79±3.19	4.95±0.31	0.81	3.88±0.84	5.26±10.07	0.32
Percentage of nursing staff shortage	19.33±3.48	8.60±4.23	0.09			

tumors in this regard. A study by Akinyemi et al. states that patients in need of surgical care were severely deprived of access to care due to the allocation of hospitals to care for patients with COVID-19 virus disease (28). It appears that the lack of beds and equipment in Shiraz hospitals is hampering the provision of quality care. It has compromised the safety of patients during treatment.

In the present study, it was also shown that in the field of leadership and governance of Shiraz hospitals in medical sciences the mean and standard deviation were 62.23±11.82. The medical services were also identified. Poor crisis management is the result of surprise and unpreparedness for an epidemic and delayed decision-making. A study in China showed that

crisis management in hospitals was unpredictable (29). It seems that in hospitals with more donor support, the decision-making power of hospital managers to provide quality care was greater, while in other hospitals the decision-making power of managers was more limited (30).

The present study has focused on the resilience of the hospital services quality in the dimension of human resources in Shiraz Medical Sciences Hospitals, with a mean and standard deviation of 77.80±12.66%, which is known as the main challenge faced by the study participants. Also, in Crincho's study, respondents reported that the shortage of health workers in the country worsened with the spread of the epidemic and challenged the functioning of health systems (31, 32). These findings are consistent with our study.

It is well known that one of the challenges hospitals are faced with is the shortage of nursing staff. This shortage of staff affects the provision of services to COVID-19 patients. Based on the results of the present study, Narwal et al. in India and a study by Haldane et al. on 28 countries, the challenge of labor shortage has been identified as one of the factors reducing the resilience of hospitals. This has led to delays in patient care, staff burnout, medical malpractice, and unsafe patient care (24, 33).

There seems to be a severe shortage of nursing staff in the hospitals affiliated with Shiraz Medical Sciences. Even in one of the study hospitals for obstetrics and gynecology, this is the place of hospitalization for COVID-19 patients for pregnant mothers. The head nurse of the COVID-19 ward has a degree in midwifery, but due to the sensitivity of pregnant mothers, midwifery and nursing services should be provided during an epidemic. They do not receive respiratory care to provide services to patients.

In the present study, staff training went well in all hospitals. In this regard, the results of the study were satisfactory, and the colleagues showed that the training of the personnel in the processes of rapid identification and isolation of suspected cases of COVID-19 was successful (34). Shiraz hospitals were successful in this area, and the strength of this epidemic enhanced their knowledge and readiness in critical epidemic conditions.

The present study showed that the dimension of access to medicine and medical care in Shiraz medical hospitals, with an average and standard deviation of 79.50 ± 16.12 , had the highest level of quality resilience. However, hospitals continue to face challenges in providing medicines and medical equipment during the COVID-19 pandemic. In some hospitals in Shiraz, there was a shortage of oxygen suppliers and ventilators during the treatment process for COVID-19 patients, which affected the provision of safe care for patients requiring oxygen. The provision of oxygen to patients was questioned (35). A study by Garge in India also showed that the lack of an oxygen machine made it difficult to provide safe care (36), which is consistent with the results of the present study.

In this study, one of the hospitals specializes in oncology and hematology. The drugs and consumables needed by cancer patients were

insufficient and of low quality. In the same line with our study, Al-Shahrani et al. stated that COVID-19 was faced with medication shortages and insufficient nursing care (37). In a study by Edge et al. in Australia, 42% of cancer patients experienced a superficial level of care disruption (38), which is almost consistent with the present study.

In these circumstances, the sanctions appear to have had a significant impact on the supply of medicines and equipment, and the inadequacy of medical resources was exacerbated by the COVID-19 virus pandemic. Some consumables, such as serum guides or some drugs with an IV color set to avoid being affected by the light reaction, had to be injected into the patient, which was not done due to the lack of supply, and sometimes even cancer patient relatives were inevitably sent out of the hospital to buy medicine. These factors have a significant impact on patient safety.

In the present study, the resilience of the hospital services quality in the field of financing of Shiraz medical hospitals had a mean and standard deviation of $60.42 \pm 16.01\%$. According to the interviewees in the COVID-19 pandemic, with the increase in the use of personal protective equipment and antiseptics, a global shortage was created, which was imposed on hospitals by manufacturing companies due to the increase in prices. In a study by Aknemi et al., respondents acknowledged that the Nigerian health sector was underfunded before the outbreak and that the situation was worsened (28). This finding is consistent with the results of the present study. In Iran, the Ministry of Health, Treatment, and Medical Education is responsible for the health system. It seems that under the conditions of the epidemic disease, despite the severe sanctions in the field of funding and equipment needed by hospitals, it did its best to eliminate the disruption in the process of providing quality services.

In this study, staff satisfaction during the COVID-19 virus disease was $57.98 \pm 4.41\%$ with a mean and standard deviation. It seems that this index was affected by double work pressure, untimely payment of staff demands, and lack of organizational vitality. The index is influenced by the patients' waiting status for care.

The present study showed that in the health information system of Shiraz University of Medical Sciences with $73.40 \pm 11.17\%$, the

participants faced challenges in compiling inappropriate guidelines, not registering patient records electronically, and slowing down the information system. A study in Pulla, India, found that hospitals performed poorly in terms of health information system infrastructure and electronic health records (39). Jabin's study suggested that electronic health records were being used in Iran and Nigeria (40), which contradicts the findings of this study. Among the hospitals studied, only one registered patient file was used as an electronic pilot study.

In general, the results of the present study show that most of the hospitals in the country have many problems and unfavorable conditions such as lack of manpower, lack of oxygen, poor quality of consumables, inappropriate beds, lack of motivation, the staff's dissatisfaction, patients' dissatisfaction, and long waiting lines.

Limitation

Limitations of this study could be the COVID-19 pandemic conditions and the reluctance of hospital staff to share their experiences due to the sensitive nature of the epidemic. Another limitation was that managers allowed limited sampling of the researcher to maintain social distance and reduce traffic in the hospital.

Conclusion

The quality of hospital services is an indicator of the governance of the Ministry of Health during the pandemic. Significant health inequalities were observed. The assessment shows that despite the many efforts made in this area, most of the hospitals in the country face many problems and unfavorable conditions. Policymakers and managers need to prioritize comprehensive hospital preparedness during critical epidemics. To enhance hospital resilience, managers must provide medications and medical equipment, as well as personal protective gear and strategies for recruiting, retaining and training staff. Managers should also prioritize communication and collaboration with other healthcare facilities and governmental agencies to ensure a coordinated response during the pandemics. The researchers suggest that systematic review studies should be conducted on the quality of hospital services resilience in the pandemic conditions.

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Authors' Contributions

All the authors conceived and designed the study. NM collected the data. All authors analyzed the data. NM wrote the first draft of the manuscript. All the authors approved the final manuscript.

Ethics Approval

This study was approved by Iran University Medical Science, IR.IUMS.REC.1400.110.

Conflict of Interest

There are no conflicts of interest

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