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Original Article

Investigating the Effect of the 7S Technique on Performance Management and Productivity of Operating Room Staff: An Interventional Study

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Abstract

Background: One of the most important issues in a health care system is the performance management and productivity of employees. Sigma technique is a quality improvement method, which has proved effective in many organizations and has recently been used in the health care system, especially in the operating room. The aim of this study was to investigate the effect of the Seven Sigma technique (7S) on performance management and productivity of operating room staff in selected educational and medical centers of Iran University of Medical Sciences.

Methods: In this interventional research, the study population consisted of 45 operating room staff including technicians, technologists, and surgeons. Before the intervention, a WhatsApp channel was created to gather group members. Then, over the course of three weeks, the principles of the Seven Sigma technique were gradually sent to the research population, and participants were asked to carefully review the materials. Every three days, after posting a question in the channel to ensure understanding of the previous topic, the next section was also posted in the channel. Then, after three weeks, a productivity questionnaire was sent to the research population, and using a researcher-made checklist, the performance of the employees was evaluated. Standard statistical methods were used to analyze the data in SPSS version 22.0.

Results: From a total of 45 staff, 62% were women and 38% were men. The majority of subjects (36%) were between 24 and 28 years old. The majority of personnel (89%) had a university degree in operating room, and most of them (84%) had a bachelor's degree. Most of the staff (91%) worked rotating shifts during the month. There was a significant difference between the pre-test and post-test mean scores of performance management ($P<0.001$). There was also a significant difference between the pre-test and post-test mean scores of productivity ($P<0.001$).

Conclusion: The findings indicated the effectiveness of the 7S technique in performance management and productivity of the staff. Therefore, the relevant authorities are requested to increase performance management using the 7S technique to reduce defects and problems limiting the efficiency of personnel in the operating room. This method can also be practical and useful for other wards of hospitals.

Keywords: 7S technique, Performance management, Productivity, Operating room

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Introduction

One of the important goals of hospitals is to provide quality, safe, effective, and efficient diagnostic and treatment services in order to ensure, maintain, and promote the health of the community (1,2). To increase the productivity of hospitals, managers must simultaneously pay attention to the effectiveness of hospital services. Lack of attention to the efficiency of hospitals leads to increased costs for hospitals, which restricts access to their services. On the other hand, waste of resources may reduce the quality of hospital services and can decrease the effectiveness of hospital services and increase diseases and disabilities in society in the long run (3). Operating rooms are ripe with inefficiencies that have a negative financial impact on

their institution and cause frustrations for operating room personnel and dissatisfaction among patients. Numerous factors constrain the productivity and efficiency of the operating room staff, including infrastructure, scheduling variation, variability in patient problems, operations types, and unexpected events that occur in any surgical practice (4). Therefore, managers must work to increase the efficiency of hospitals and maximize the benefit over the cost incurred or minimize the expenses to have a specific gain (3). Quantification of product variation can be traced back to the 1920s when Walter Shewhart showed that a process requires correction when it is 3 Sigma away from the mean (5). Shewhart was an inspector of Western Electric Company where he noticed that the majority of causes of defects were mainly due to variation. This was the beginning of statistical process control. Due to his insight and use of statistical tools, companies began to consider variation in the process rather than focus on identifying defects in finished products (6). Today, organizations need capable and effective staff to achieve efficiency for comprehensive growth and development. The exchange of knowledge and information in an environment with a supportive culture for the creation, maintenance, and optimal application of knowledge is one of the most important components affecting the performance of employees and the organization (7). One of the main goals of any organization is to achieve productivity. Research has shown that there is a positive correlation between hospital culture and manpower retention, which can lead to labor productivity (8). Productivity is synonymous with the sustainability and success of an organization, especially health care organizations. The survival of an organization depends on the productivity of those who work in it (9). Different approaches to performance management and productivity management of technologists have been proposed, each of which with its own strengths and weaknesses, and their providers have considered specific aspects of the organization. Most of these approaches have become more comprehensive over time, and additional criteria have been considered and evolved to meet the needs of the environment (10). Discipline and safety are the most important parameters of success in organizations. The role of discipline is so important that it is considered in all models and standards of organizational management and excellence. To this end, leading organizations have taken serious and effective measures to enjoy the benefits of establishing discipline. In this regard, various models have been used by organizations to organize the environment. Neatness to achieve work goals and ideals is the main concept, which requires necessary context and conditions to attain (11). Sigma technique is among the process improvement methods, which is increasingly used in healthcare and more recently in the operating room itself. The principles of the Sigma technique are ideal for ensuring the quality of various products. Other occupations may find the Sigma system too rigid or impractical for their particular circumstances. Sigma technique (5 Sigma, 6 Sigma, and more recently 7 Sigma) is a business management strategy that improves quality and effectiveness (12). This technique relies on an organized way to cover the root cause of the problem and includes the following steps: define, measure, analyze, improve, and control. In this method, first, the problem is defined fully and meaningfully and then its extent and causes are measured and analyzed. Improvement is achieved by eliminating the root causes of the problem, and ultimately control is maintained to ensure the stability of improvement. The Sigma technique intends to make processes more integrated and accurate using statistical methods (13). One of the benefits of the Sigma technique is goal setting that improves customer satisfaction, ensuring that manufactured goods and services meet customer demands (14,15). In general, the main goal of the Sigma technique is that the scales at each level should return to processes at higher levels and ultimately be linked to strategic goals (16,17). Implementing the 7S technique makes a workplace cleaner, safer, more organized, and more enjoyable, and the use of the room floor can be improved. Workflows become smoother and activities can be more regular, and value-added activities are decreased as well as search time for tools, materials, and documents. Because clean and tidy equipment is less likely to break down, machine breakdowns are reduced, and pre-failure detection and repair become easier, which increases the life of the equipment. Errors are thereby minimized, leading to the production of flawless products and reduction of wastage. Staff morale and satisfaction can be improved, and the productivity of the organization is promoted along with the quality of products and services (17).

7S is a simple and practical approach to developing a quality culture in the workplace, which is relatively easy to do and requires minimal additional resources. It should be noted that just implementing the 7S or organizing the workplace is not sufficient and that continuous monitoring and supervision of all 7S activities are of special importance and can be considered by distributing questionnaires at regular intervals. If the respondents' answers are weak, it indicates weakness of workplace organization (17)

No study was found to investigate the effect of the 7S technique in the operating room after conducting an extensive literature review. The new version of the 7S technique has a more complete concept of the goals and activities of the specialized operating room team, including team spirit and safety. Given that the operating room environment is full of various hazards in which safety can be reduced, the present study was conducted to investigate the effect of the 7S technique on performance management and productivity of operating room staff in selected educational and medical centers of Iran University of Medical Sciences in 2021.

Materials and Methods

The present research is an interventional study that was

performed in Firouzgar hospital affiliated with Shiraz University of Medical Sciences from January to November 2021. The research population consisted of the staff working in Firouzgar hospital under the auspices of Iran University of Medical Sciences. The sample of this research consisted of 45 individuals, including 32 operating room technologists, 8 anesthesia technologists, and 5 surgeons. They were selected using a simple random sampling method with proportional allocation. They filled out the questionnaires and checklists in a pre-test and post-test format. The data collection tool used in this study consisted of a demographic information form and a checklist of the 7S technique. The demographic information form included various variables such as age (measured in years), gender (male/female), marital status (single/married/divorced/widowed), education level (associate's degree, bachelor's degree, master's degree), work experience (measured in years), employment type (project, contractual, temporary, official), and shift type (fixed morning, fixed afternoon, rotating). The researcher was responsible for creating this form, which was then assessed for content validity. To ensure its validity, the form was given to ten experienced professors who provided their feedback and suggestions for improvement. Their corrective comments were incorporated into the final version of the questionnaire. The final version of the questionnaire used in the study was determined based on the content validity ratio (CVR) and content validity index (CVI). In this study, in order to determine the reliability of the test, the Cronbach's alpha has been used. The obtained value for the performance management questionnaire was 0.895, and it was 0.751 for the employee productivity questionnaire. These values indicate that the questionnaires used in the study had an acceptable reliability. Inclusion criteria were as follows: having at least 6 months of work experience, no pregnancy over the last months, and no history of musculoskeletal disorders or mental illness. Exclusion criteria included the following: unwillingness to continue the study, improper completion of the questionnaire and checklist, and lack of active cooperation during the training. Data collection tools in this study were a demographic profile form and an S7 technique checklist as well as performance management and employee productivity questionnaires (researcher-made). The researcher sampled qualified individuals after receiving permission and ethical approval from the Vice Chancellor for Research at Iran University of Medical Sciences and presenting it to the officials of Firoozgar hospital as well as explaining the research objectives to the officials and obtaining their consent and cooperation. The researcher first introduced himself to the operating room manager and then gave the participants an informed consent form to sign. Demographic information, performance management questionnaire, employee productivity questionnaire, and 7S checklist were completed by subjects before and after the intervention. Before the intervention, a WhatsApp channel was created and the members of the intervention group were added to the channel. Over the course of three weeks, the principles of the 7S technique were gradually sent to the participants and they were asked to carefully review the material. Every three days, after placing a question in the channel, the next section was placed in the channel to ensure the study of the previous topic, and after three weeks, the employee productivity questionnaire was provided to the participants and assessed their performance using a researcher-made checklist. The content included seven basic principles of the 7S technique, which were stated in each session as follows. The lack of proper collaboration from participants in the study was helpful in explaining the effectiveness of this research in optimizing the work environment, increasing productivity, and facilitating performance in this matter.

The First Session (Sort)

The first step of the 7S technique is sorting. At this stage, the red label technique was used to separate the essential and practical tools and equipment. To determine the necessary items, the technique of preparing a list of items was used. For this purpose, individuals were asked to list the items needed for the next patient or procedure. This method lists the equipment and tools that are used every day during work and attempts to store and maintain these items close to the workplace, and less commonly used tools and equipment are stored away from the workplace. Unnecessary equipment was given a red label to indicate its status. The label included items such as tools and equipment, serial number, label date, and the section name. After determining the status in consultation with the head of the ward, some equipment and tools were left in the ward or returned to the central warehouse of the hospital if they were usable, and if they were not usable, they were discarded. At this stage, all items and equipment, old books, charts, and old posters that had not been used in the past year were removed from the ward and returned to the central warehouse of the hospital and the central library of the hospital or were thrown away in some cases.

Second Session (Set in Order)

At this stage, the arrangement of equipment and tools was done and the appropriate place for them was determined so that they could be reached quickly and easily. Using the marking technique, all items including medicines, consumables, equipment in stocks, anesthetics, and resuscitation trolleys, and packing room were arranged, labeled, or their labels changed. All labels were typed and presented in legible fonts. In this way, the staff could easily find the equipment and tools they needed and return them at the end of the work. Moreover, the expiration date of drugs, sets, and consumables was listed on editable labels. The kiting (involves compiling a set of the raw materials and components required to make specific products) technique was used in operating rooms to make it easier to use consumables Thus, equipment packages including syringes, angiocatheters, disposable gloves, and latex

gloves were placed in the trolleys. This strategy prevented additional movement of staff in the ward and the search to find them during surgery. The tools were placed using two techniques: performance-based and procedure-based storage. Therefore, devices that performed the same function or were used in a clinical procedure were placed together in one place. The necessary equipment was stored in accessible locations, and less commonly used equipment was stored in areas that were more difficult to access. Worn-out red warning labels were replaced using the painting technique. The location of the mobile equipment in each room such as the catheter was determined using the standard color painting technique (yellow for dividing lines). Washable labels were used vertically and horizontally to mark the shelves for easy access to essentials in the warehouse of the ward.

Third Session (Shine)

In the shine phase, all impurities and contaminants are removed from the operating room environment as an initial stage. In this program, the cleaning time of each part of the operating room was determined along with its cleaning manager who was established in the operating room. In coordination with the head of the operating room, it was decided that the responsibility of cleaning each operating room in every shift should be assigned to one person. In this way, at the beginning of the shift, the responsibilities of cleaning were determined along with the division of labor. The initial cleaning was done in three steps as follows: (*a*) stored items including supplies, sterile tool packs, and boxes, (*b*) equipment including laboratory tools, equipment, monitoring, caudexes, beds, tables, chairs, and computers, and (*c*) space including ordinary surfaces, floors, work areas, corridors, walls, windows, shelves, storage, rooms, and lamps. Transparent covers were used to prevent the accumulation of dust on monitors and operating room equipment. The cleaning program was developed for weekdays and installed in the operating room. Commonly touched surfaces such as telephones, computer keyboards, serum stands, and chair handles were cleaned, which are common places for pathogens to accumulate.

Fourth Session (Standardize)

In the continuity and safety phase, maintaining the desired condition is followed by separation, order, cleanliness, and safety at work. At this stage, the responsibilities of each staff member in the previous three steps were identified. Hospitals look for ways to reduce redundancies as much as possible because of the increasing costs of health care organizations. The S7 work cycle chart tool is a tool that analyzes a company's "organizational design". The goal of the model is to depict how effectiveness can be achieved in an organization through the interactions of seven key elements: structure, strategy, skill, system, shared values, style, and staff. It was used to determine the responsibilities of each person. This tool lists the activities that need to be done in each area and presents a repetitive cycle for each activity. The kiting technique or equipment package was another measure at this stage that reduced the need to search and return equipment and maintained order in the organization. Pre-filled and labeled syringes were used for anesthetic drugs to remove drug bottles and labels. The deletion technique was performed at the beginning of each shift.

Fifth Session (Sustain)

The purpose of this stage (education and discipline) is to contribute to education and culture. In this step, the practical concepts of this technique were taught to all participants during the educational intervention, and the groundwork was laid for the institutionalization of a self-discipline culture.

Sixth Session (Safety)

Safety is a condition of protection against physical, social, spiritual, financial, political, emotional, occupational, psychological, educational, or other unsuccessful consequences of injury, error, accident, and any other event that may be considered undesirable. The action steps are as follows: error-proof, safety instructions and symbols, warnings, alarms, identifying and labeling the area with appropriate symbols, and safety training for employees. The needed resources are safety and sign instructions, protective personal equipment, and a safety instructor or expert. As a result, mistakes are avoided, accidents are reduced and the work environment becomes safer.

Seventh Session (Spirit)

Team spirit is the willingness to work as part of a team, which describes the steps involved in forming an S7 team with the help of a team leader, regular meetings to set benchmarks and strategies for success, lectures, motivational and cooperative training for the intervention group. Data collection in this study was done through a checklist and a questionnaire before and after the intervention. A checklist and questionnaire were provided to the samples during the morning or evening shift. After collecting all the forms, data analysis, application of the solution, and its implementation were performed. No data were collected from the time of intervention until two weeks later. After two weeks, the individuals read and completed the forms again, and finally, the data were collected.

Data Analysis

SPSS version 20.0 was used for data analysis. To analyze the collected data, descriptive statistical methods, including tables, and central and dispersion indicators, were used. A one-sample *t* test was employed for comparison between the two groups. One-way analysis of variance (ANOVA) and paired *t* test were used for comparison between three groups and intra-group comparisons, respectively.

Results

Out of 45 subjects, 28 (62%) were women and 17 (38%) were men. The majority of subjects (36%) were between 24 and 28 years old. The majority of the participants (89%) had a university degree in the operating room, and most of them (84%) held a bachelor's degree. The majority of participants (91%) worked rotating shifts during the month. Additionally, the average work experience was 6.93 years (Table 1).

The results of Levene's test showed that the null hypothesis stating the equality of variances of the pre-test scores of individual productivity in different age groups cannot be rejected at a 5% error level. According to a one-way analysis of variance, the mean difference of the pre-test scores of individual productivity is not significant for age at the error level of 5%. The results of Levene's test showed that at a 5% error level, the null hypothesis cannot be rejected, which states that the variances of pre-test scores of individual productivity are equal in the two groups of men and women. Based on the results of *t*-test, it is not possible to accept the significance of the difference in the pre-test mean scores of individual productivity between women and men at an error level of 5%.

The results of Levene's test showed that at a 5% error level, the null hypothesis expressing the equality of variances of pre-test scores of performance in different age groups cannot be rejected. According to a one-way analysis of variance, the mean difference of the pre-test scores of performance is not significant for age at an error level of 5%. The results of Levene's test showed that at a 5% error level, the null hypothesis cannot be rejected, which states that the variances of the pre-test scores of performance are equal in both groups of men and women. Based on the results of the *t* test, the significance of the difference in the pre-test mean scores of performance between women and men at 5% error level cannot be rejected.

Table 1. Demographic Information of the Study Population

Variables	Subgroup	n	%
Age (year)	<24	5	10
	24-28	16	36
	29-32	12	27
	>32	12	27
Gender	Male	17	38
	Female	28	62
Marital status	Single	33	73
	Married	12	27
Educational level	Technician	2	4.5
	Bachelor's degree	38	84.5
	Ph.D.	5	11
Type of employment	Contractual	3	7
	Permanent	13	29
	Formal	15	33
	Temporary	14	31
Shit work	Rotational	41	91
	Evening	4	9
Work experience (y)	<5	26	58
	5 until 10	8	18
	11 until 15	7	16
	>15	4	9

Based on the results of Levene's test, the null hypothesis of the equality of variances of the post-test scores of productivity cannot be rejected at the level of 5% error in different age groups. According to the one-way ANOVA, at 5% error level, the mean difference of post-test scores of individual productivity is not significant for age. The results of Levene's test indicated that at a 5% error level, the null hypothesis stating that the variances of pre-test scores of individual productivity are equal in the two groups of men and women cannot be rejected. Based on the results of *t* test, it is not possible to accept the significance of the difference in the pre-test mean scores of the individual productivity between women and men at a 5% error level.

According to Levene's test, at a 5% error level, the null hypothesis stating that the variances of the post-test scores of performance are equal in different age groups cannot be rejected. One-way ANOVA shows that at a 5% error level, the mean difference of the post-test performance scores is not significant for age. Levene's test reveals that at a 5% error level, the null hypothesis of equality of variances of the post-test mean scores of performance cannot be rejected in both groups of men and women. Based on the results of the *t*-test, the significance of the difference in the mean scores of the post-test performance between women and men cannot be accepted at a 5% error level (Table 2).

Based on the *t* test, it is not possible to deny the significance of the difference between the pre-test and post-test mean scores of individual productivity at a 5% error level. According to the results of the *t* test, it is not possible to deny the significance of the difference between the pre-test and post-test mean scores of performance management at a 5% error level (Table 3).

Discussion

The results of the current study demonstrated a significant difference in the mean scores of employee performance management and productivity before and after intervention. These findings are consistent with previous studies, providing further support for the effectiveness of the intervention. The use of the 7S technique can significantly enhance the performance management of operating room employees. The findings of the present study are consistent with the results of the studies by Improta et al (18), Kuo et al (19), Pandit and Debmallik (20), Kieran et al (21), and Improta et al (22).

In the study conducted by Kuo et al (19) using the Lean Six Sigma System with the aim of reducing the length of stay in post-anaesthesia care unit to 45 minutes over three months, a 40% improvement in patient care and a 35% decrease in waiting time for surgery were achieved. They

Table 2. Comparison of the Mean Scores of Performance Management and Individual Productivity Before and After the Intervention Based on Demographic Information of the Subjects

Variables	Performance			Productivity		
	Before	After	*P* Value	Before	After	*P* Value
Gender						
Male	0.23 ± 3.58	0.17 ± 4.47	< 0.001	0.24 ± 3.93	0.21 ± 4.54	< 0.001
Female	0.32 ± 3.58	0.17 ± 4.39	< 0.001	0.32 ± 3.58	0.21 ± 4.52	< 0.001
P value	0.28	0.31		0.35	.68	
Education						
Expert	0.27 ± 3.63	0.22 ± 4.43	< 0.001	0.25 ± 3.89	0.21 ± 4.55	< 0.001
Specialist	0.22 ± 3.71	0.29 ± 4.39	< 0.022	.44 ± 4	0.13 ± 4.43	< 0.06
P value	0.52	0.72		0.4	0.22	
Marital status						
Single	0.26 ± 3.62	0.2 ± 4.41	< 0.001	0.28 ± 3.91	0.22 ± 4.52	< 0.001
Married	0.27 ± 3.64	0.25 ± 4.43	< 0.001	0.27 ± 3.89	.19 ± 4.55	< 0.001
P value	0.8	0.81		0.85	0.67	
Type of employment						
Permanent/formal	026 ± 3.6	0.24 ± 4.43	< 0.001	0.24 ± 3.9	0.21 ± 4.58	< 0.001
Other	0.27 ± 3.68	0.2 ± 4.4	< 0.001	0.32 ± 0.92	0.17 ± 4.45	< 0.001
P value	0.3	0.72		0.92	0.42	

Levene's test was used to compare the mean scores of performance management and individual productivity before and after intervention based on demographic information.

Table 3. Comparison of the Mean Scores of Performance Management and Employee Productivity before and after the Intervention.

Time	Performance	Productivity	*P* value
Before the intervention	0.27 ± 3.63	0.27 ± 3.9	< 0.001
After the intervention	0.22 ± 4.42	0.2 ± 4.53	< 0.01
P-value	< 0.001	< 0.001	

The independent *t* test was used to compare the mean scores of performance management and employee productivity before and after intervention.

reached their goals in approximately 3 months, which is in line with the findings of the present study.

In the study by Pandit and Debmallik (20), which used the Lean Six Sigma System to improve waiting time for imaging and image preparation time, the waiting time for patients to enter the imaging room was reduced from 41 to 18 minutes. Moreover, the waiting time for the preparation of patients' images was reduced from 99 to 55 minutes. The findings of this study are consistent with those of the present study.

Kieran et al (21) conducted a study in 2017 which aimed at reducing the time of drug delivery to patients using the Lean Six Sigma method. They reported that the average time of drug delivery to patients was decreased to 95.5 minutes. The average number of interruptions per round reduced to 14. The average number of drug supply interruptions reduced to 2 per round. The results of the present study on the effect of 7 Sigma on improving the performance of operating room staff are consistent with the results of the study by Kieran et al (21).

In a study conducted by Improta et al (22) in 2017 with the aim of reducing the rate of healthcare-related infections, a hospital affiliated with the University of Federico Nipple in Italy was selected for the multi-stage DMAIC method to solve the problem after 2 years. Based on the results, the percentage of patients who were colonized with sentinel bacteria decreased from 0.36 to 0.19%. In the present study, the use of 7 Sigma was effective and improved the performance of employees, which is in line with the findings of this study.

The use of the Seven Sigma method led to an improvement in the efficiency of operating room staff ($P = 0.001$). This finding is consistent with the results of the studies by Tagge et al (13) and Trzeciak et al (23).

In a study by Coffey et al (24) using the Lean Six Sigma method, the mean rate of on time start of the first surgery increased from 23.5 to 73%. The results of this research are consistent with those of the present study in which the use of 7 Sigma improved the performance of operating room staff. In the study conducted by Tagge et al (13) using Lean Six Sigma in pediatric operating room, data analysis in the post-intervention phase showed that the average rest time between two surgeries decreased from 45 to 36.76 minutes and that the average break time between two surgeries was decreased from 85 to 75.84 minutes. The results of this research are in line with those of the present study, which used the 7 Sigma method to improve the productivity of operating room personnel.

In a study conducted by Trzeciak et al (23) in 2016, using the Lean Six Sigma method, the average length of stay of patients in the environmental control units (ECU) reduced by 24% after the intervention compared to before the intervention. Moreover, the average number of days patients stayed in the ICU was reduced from 29 to 22 days. The results of the present study are in line with those

of the study by Stephen on the effectiveness of 7 Sigma. One of the factors that increases efficiency using the 7 Sigma technique is reducing lead time. It is important to prevent wasting time on project initiation and start-up. Additionally, avoiding non-relevant tasks that reduce presence at the patient's bedside should be practiced. The team should learn how to identify these behaviors and choose appropriate strategies to quickly and effectively progress towards their goals and objectives in the project.

A limitation of this study was the lack of proper cooperation of study participants, which explains the effectiveness of this study in optimizing the work environment, increasing productivity, and facilitating performance in this regard.

Conclusion

The present study provided valuable insights into the impact of the 7S technique on performance management and employee productivity in the operating room. The findings demonstrate the positive effect of utilizing the 7S technique in improving various aspects of performance and productivity. Therefore, it is strongly recommended that the relevant authorities consider implementing the 7S technique to address and reduce the existing defects and problems within the operating room environment. By doing so, they can effectively enhance the efficiency and effectiveness of the operating room, leading to improved performance management and work efficiency.

Furthermore, it is worth noting that the benefits of the 7S technique are not limited to the operating room alone. The findings of this study suggest that this method could be applicable and beneficial for other departments and wards in hospitals as well. By adopting the 7S technique across various areas of the healthcare facility, it is possible to streamline processes, optimize resource allocation, and improve overall performance. Therefore, it is recommended that healthcare institutions consider implementing the 7S technique as a practical and useful approach to enhance performance and productivity across different units in the hospital.

In conclusion, the results of this study highlight the significant impact of the 7S technique on performance management and employee productivity in the operating room. Decision-makers and healthcare authorities should recognize and leverage the potential benefits of this technique to address existing issues and promote efficiency in hospital settings. By applying the 7S technique, hospitals can work towards optimizing their operations, improving performance management, and ultimately providing better patient care and outcomes.

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Authors' Contribution

Conceptualization: Sedigheh Hanani, Mohammad Payendeh.
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Competing Interests

The author(s) declared no potential conflict of interests with respect to the research, authorship, and/or publication of this article.

Ethical Approval

The present study was approved by Iran University of Medical Sciences (IR.IUMS.REC.1398. 1260). Written informed consent was obtained from the participants prior to their participation in the study. Maintaining anonymity, confidentiality of information, and the right to withdraw during the study were considered. The time and the place of the interviews were arranged according to the will of the participants.

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