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Assessing the implementation of the 5s system in Syrian hospitals: A field study of private hospitals in latakia governorate

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ABSTRACT

This study aimed to diagnose the current state of 5S implementation in private hospitals in Latakia. The sample consisted of 116 participants drawn from four hospitals: Noor, Hikmah, Central, and Sayyeda Hospitals. The participants spanned diverse roles, including medical, administrative, and service staff. Data was collected through a questionnaire specifically designed for this study, with the aim of measuring the extent of implementing the 5S principles. The questionnaire was distributed randomly to staff in private hospitals in Latakia. Responses were recorded on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree). Data were analyzed using SPSS-25; Cronbach's Alpha coefficients were calculated for each dimension to confirm reliability, including calculations of means and standard deviations. The collected data were encoded, processed, and analyzed using SPSS 25. Various statistical techniques were used to test the hypotheses. The most important results of hypothesis testing:1. Showed a significant, effective application of the "classification" principle within the 5S system. 2. The "sorting and organizing" principle was effectively implemented, indicating organized work environments that facilitate easy access to tools. 3. The "cleaning and shining" principle was strongly applied, reflecting high standards of cleanliness and quality. 4. The "setting standards" principle was actively applied, demonstrating ongoing efforts to establish uniform procedures.5. The hospitals demonstrated a commitment to continuous 5S principles, integrating them into organizational culture rather than temporary measures.

Contribution/ Originality: The study investigates the actual implementation of the 5S system across various dimensions within private hospitals. It is applied for the first time in a hospital in Syria and examines whether the hospitals have previously implemented it or genuinely used this technique before.

1. INTRODUCTION

In today's competitive landscape, business organizations strive to establish their presence by delivering the highest quality services that surpass customer expectations and needs. The implementation of the 5S system has gained widespread attention across various types and sizes of business entities worldwide, especially within the private hospital sector (Osman, 2017). It is regarded as a vital pathway to successful workplace transformation and continuous improvement (Almatiry & Algaoby, 2021). Achieving quality enhancements necessitates empowering employees to attain organizational objectives (Aoun et al., 2019). The 5S system forms the foundation of Total Quality Management (TQM) (Muhammed, 2021). Originating from five Japanese words starting with the letter "S,"

the system was developed in Japan by engineer Hiroki Hirano. These words have been translated into English to facilitate understanding, emphasizing practices that foster a clean, safe, and comfortable work environment if consistently implemented by employees (Badzran & Bazla, 2017; Muhammed, 2016).

1.1. Previous Studies

1. Study by Ghodrati and Zulkifli (2013): *"The Impact of 5S Implementation on Industrial Organizations' Performance"*.

This study aimed to demonstrate that 5S is a systematic technique used by organizations to organize the workplace, thereby enhancing efficiency, reducing waste, and improving quality and productivity through better environmental management. It emphasizes the need for empirical research into new management systems and their effects on organizational performance. By employing a descriptive approach (distributing questionnaires across five organizations from various sectors), the study concluded that 5S is an effective tool for advancing organizational performance and supports organizational goals toward continuous improvement and higher efficiency.

2. Study by Muhammed (2016): *"The Impact of Applying the 5S Program in Reducing Costs and Improving Productivity in Industrial Companies"*.

This survey-based study examined the opinions of specialists in the accounting and management fields. The objective was to identify the significance of the 5S program and assess its influence on cost reduction and productivity enhancement within industrial companies. To achieve these goals, a descriptive analytical approach was employed through a survey. The hypotheses were tested using responses analyzed via the T-test in the SPSS software. The key findings demonstrated that the 5S program is a vital scientific approach increasingly attracting the attention of companies, particularly industrial firms, due to its effectiveness in waste reduction and time savings through systematic workspace organization.

3. Study by Osman (2017): *"Diagnosing the Reality of the 5S System in Egyptian Hospitals"*.

This field study examined the implementation of the 5S system, comprising classification, organization, cleaning, standardization, and training within Egyptian private hospitals. To achieve the research objectives, a descriptive approach was adopted, involving the development and distribution of questionnaires among various hospitals selected based on size. The results indicated that there were no statistically significant differences in employees' awareness of the importance of the 5S system concerning demographic variables such as experience, educational level, job type, and hospital size.

4. Study by Aoun et al. (2019): *"The Effect of 5S on Employee Performance: An Empirical Study Among Lebanese Hospitals"*.

This research aimed to evaluate the impact of the 5S program on employee performance in Lebanese hospitals. Conducted across four hospitals in South Lebanon, the study employed a descriptive approach by distributing questionnaires randomly among staff members. The findings revealed that the 5S methodology has a significant and positive effect on employee performance.

5. Study by Razali, Libasin, and Jaafar (2020): *"5S Practice: Its Effects on Quality and Productivity of Work among UITM Support Staff"*.

This study assessed how implementing the 5S practices influenced work quality and productivity among support staff at UiTM Cawangan Pulau Pinang University. Using a descriptive approach, questionnaires were distributed across workshops, laboratories, and kitchens, and data were analyzed via SPSS. The results showed that work quality and productivity were rated as excellent, thereby indirectly enhancing the overall quality of services in laboratories, workshops, and kitchens.

6. Study by Almatiry and Algaoby (2021): *"The Impact of the Effectiveness of the 5S System on Employees Productivity and Operational Environment Quality: A Model of Pepsi Factory, Riyadh"*.

This study aimed to enhance employees' productivity and improve the operational environment. Conducted at the Pepsi Factory in Riyadh, the research employed a descriptive analytical approach, utilizing questionnaires and SPSS software to analyze the proposed relationships within the research model. The findings indicated that participants agreed on the current state of the operational environment and its components, as well as the significant role of the 5S system in improving both employees' productivity and the overall operational environment.

7. Study by Kanabar, Piparva, Kanabar, and Pharmalecture (2024): "*The Impact and Challenges of the Implementation of 5S Methodology in Healthcare Settings: A Systematic Review*".

This systematic review aims to synthesize the literature on the implementation of the 5S methodology in healthcare, its impact, and factors influencing successful implementation.

A comprehensive literature search was conducted in PubMed, Google Scholar, and Cochrane databases for original studies on the implementation of the 5S methodology in healthcare settings. Studies were screened based on inclusion and exclusion criteria, and data were extracted on study characteristics, implementation details, outcomes, and key findings. The findings of this systematic review suggest that the implementation of the 5S methodology in healthcare settings can lead to positive outcomes, such as improved organization, cleanliness, and safety in the workplace, increasing staff satisfaction and motivation, reducing wastage, and enhancing utilization of healthcare services.

1.2. Difference between the Current Study and Previous Research

Previous studies primarily focused on defining the 5S program, its importance, and its impact on employees' performance and productivity levels. In contrast, the present study investigates the actual implementation of the 5S system across various dimensions within private hospitals, specifically in Latakia Governorate. Applying the 5S system in the hospital sector is crucial because it serves as the foundation and key to successfully transforming and improving any workplace environment.

1.3. Research Problem

Recently, there has been significant interest in implementing the 5S system across both public and private organizations of various types. However, based on observations, there appears to be a predominant association of the application of this concept with profit-oriented organizations. Drawing on previous research, this study aims to explore the current state of 5S application, specifically within private hospitals in Lattakia.

The Main Research Question:

- What is the reality of 5S system implementation in private hospitals in Latakia Governorate?

The Research Sub-Questions:

- What is the status of applying the 5S system in terms of Sorting in private hospitals in Latakia Governorate?
- What is the status of applying the 5S system in terms of Set in Order?
- What is the status of applying the 5S system in terms of Shine?
- What is the status of applying the 5S system in terms of Standardize?
- What is the status of applying the 5S system in terms of Sustain?

1.4. Importance of the Research

The significance of this scientific investigation lies in its ability to address key questions regarding the implementation of the (5S) system within private hospitals in Latakia Governorate. Employing various research tools, this study highlights the importance of understanding how the (5S) system is applied and its impact on healthcare delivery. This topic is particularly valuable as it enriches knowledge of the (5S) concept and provides

insights into its practical application in private hospitals in Latakia, which serve both the local community and neighboring regions.

Practically, this research plays a crucial role in increasing awareness among private hospital administrators in Latakia about the importance of implementing the (5S) system, especially amidst rising competition. Adoption of this system can enhance the reputation of these hospitals by improving the quality of treatment services to meet patient and stakeholder expectations on a competitive basis. Furthermore, given that the healthcare sector significantly influences societal well-being, both physically and psychologically improving hospital efficiency reflects positively on societal strength and resilience.

1.5. Research Objectives

This study aims to:

- Assess the current state of (5S) system implementation in private hospitals.
- Explore the principles of the (5S) system as applied in these hospitals.
- Answering specific research questions related to the study.
- Validate the hypotheses proposed.

1.6. Variables of the Research

(5S) System Principles and Their Dimensions:

- Sorting.
- Set in Order.
- Shine.
- Standardize.
- Sustain.

1.7. Research Hypotheses

1.7.1. Main Hypothesis

- There is no application of the (5S) system in private hospitals in Latakia Governorate.

1.7.2. Sub-Hypotheses

1. The (5S) system is not applied in the principle of sorting in private hospitals in Latakia.
2. The (5S) system is not applied in the principle of Set in Order.
3. The (5S) system is not applied in the principle of Shine.
4. The (5S) system is not applied in the principle of Standardize.
5. The (5S) system is not applied in the principle of Sustain.

2. RESEARCH METHODOLOGY

Given the nature of this research and the data to be obtained, the researcher relied on the descriptive analytical approach, as he relied on the study of Osman (2017) with modifications to the questionnaire phrases to suit the current study through 25 phrases that addressed the principles of the five S's (Classification, arrangement and organization, polishing and cleaning, setting standards, continuity). The questionnaire was distributed to a random sample of employees in private hospitals in Lattakia during the first quarter of the year 2025. A total of 116 surveys were distributed by hand after verifying the structural validity of the scale (internal consistency), by calculating Cronbach's alpha coefficient for each dimension. A five-point Likert scale from 1 (Strongly disagree) to 5 (Strongly agree) was used to prepare the study tool, and then the data were entered into the statistical analysis program SPSS

25 to conduct appropriate tests, where arithmetic means and standard deviations were calculated, and hypotheses were tested.

3. DATA COLLECTION METHOD

Primary Data: Data were collected via a structured questionnaire specifically designed for this research. The questionnaire effectively measures the level of (5S) principles' implementation.

Secondary Data: This includes Arabic and foreign books and references, related articles and reports, and previous research and studies that addressed the study topic. Research and browsing were also conducted on various internet sites.

3.1. Research Population and Sample

3.1.1. Population

The population includes all employees in private hospitals within Latakia, totaling approximately 820 individuals.

3.1.2. Sample

The sample includes employees across all managerial levels within these private hospitals. Using Thompson et al. (2012) formula Thompson et al. (2012) the sample size was calculated to be 116 units of observation from the total population of 820. The formula employed is.

$$n = (N * p(1-p))/[((N-1) * (d\text{^}2/z\text{^}2\ \ )) + p(1-p)] = 116$$

Where:

- $N = 820$ (Total population).
- $z = 1.96$ (Corresponding to a 95% confidence level).
- $p = 0.50$ (Assumed proportion of the trait's presence).
- $d = 0.05$ (Margin of error).

Simple random sampling was used to distribute questionnaires among various hospital staff, including general managers, deputy managers, department heads, section heads, and head nurses.

3.2. Research Boundaries

- Scientific Boundaries

The study focuses exclusively on examining the application principles of the (5S) system, originally developed in Japan, from the perspective of employees in private hospitals in Latakia with various job titles.

- Geographic Boundaries

The research is limited to private hospitals within Latakia Governorate.

- Time Boundaries

Data collection and analysis were confined to the first quarter of 2025.

4. LITERATURE REVIEW

4.1. Definitions of 5S

5S can be defined as one of the quality tools used to reduce waste and optimize productivity by maintaining an orderly workplace and using visual cues to achieve more consistent operational results (Gapp, Fisher, & Kobayashi, 2008; Janakiraman & Gopal, 2007; Parrie, 2007). In addition, some previous researchers have described 5S as an acronym of five Japanese words that mean 'housekeeping'. The concept of 5S stands for seiri (Sorting), seiton (Neatness), seiso (Cleanliness), seiketsu (Standardization), and shitsuke (Discipline) (Ho, Cicmil, & Fung, 1995).

The researcher in this study has defined 5S practices as an effective technique to improve the quality of products and services and also enhance the productivity of the firm's performance.

4.2. The Role of the (5S) System in Quality Improvement

In the face of intense global market competition, organizations are increasingly compelled to pursue continuous improvement initiatives to ensure sustainable customer satisfaction and a competitive advantage. This relentless pressure necessitates enhancements in product and service quality, operational efficiency, flexibility, safety, and timely delivery, ultimately contributing to organizational growth and reputation (Singh, 2014).

4.3. The Role of the (5S) System in Continuous Improvement

Employee involvement is essential for successful improvement initiatives. A well-implemented (5S) strategy not only minimizes waste but also enhances daily operational functions. Since employees play a crucial role in the system's deployment, understanding their perceptions of (5S) practice and its impact on their work conditions is vital (Anthony, 2011).

Given these considerations, the (5S) system in hospitals is viewed as a comprehensive framework capable of facilitating effective and efficient decision-making through continuous improvement. It promotes management practices that align with the organization's vision and mission, applying the principles universally to all staff without discrimination.

4.4. Nature of (5S) System

The (5S) system serves as both an initial step and a pivotal factor for successful workplace improvements. It is a straightforward methodology aimed at creating a clean, organized environment where items are easily accessible (Al-Zahrani, 2011). At its core, the (5S) philosophy promotes the idea that everything has its place, and everything is in its place, applicable across industries—be they industrial, commercial, service-oriented, or governmental (Thompson et al., 2012).

Continuous improvement is fundamental to modern quality management and is essential for organizations seeking sustainability and growth (Muhammed, 2021). The (5S) concept underpins many quality improvement frameworks such as Total Quality Management, ISO standards, and Lean Management, among others. Its effective implementation has been shown to enhance the work environment, making it safer, more comfortable, and more productive while simultaneously reducing operational costs (Kanabar, Piparva, Kanabar, et al., 2024).

In today's highly competitive global market, organizations are compelled to embrace continuous improvement strategies such as (5S) to achieve sustainable customer satisfaction and a competitive advantage (Singh, 2014). Initially practiced in Japan since the early 1980s, the 5S system is now widely adopted across both public and private sectors worldwide (Razali et al., 2020). Its simplicity and logical terminology facilitate broad applicability, regardless of industry size or type (Ghodrati & Zulkifli, 2013). Kanabar, Piparva, Kanabar, et al. (2024) describe the (5S) system as a comprehensive, organization-wide initiative that engages all employees to enhance operational efficiency.

The application of 5S helps organize the workplace, starting from the physical environment and gradually extending to functional aspects. The application of 5S simplifies activities through the reduction of waste and unproductive or unnecessary activities. It is also helpful in improving quality, efficiency, and safety. 5S is, therefore, a key activity in the path to Kaizen and achieving TQM (Janakiraman & Gopal, 2007).

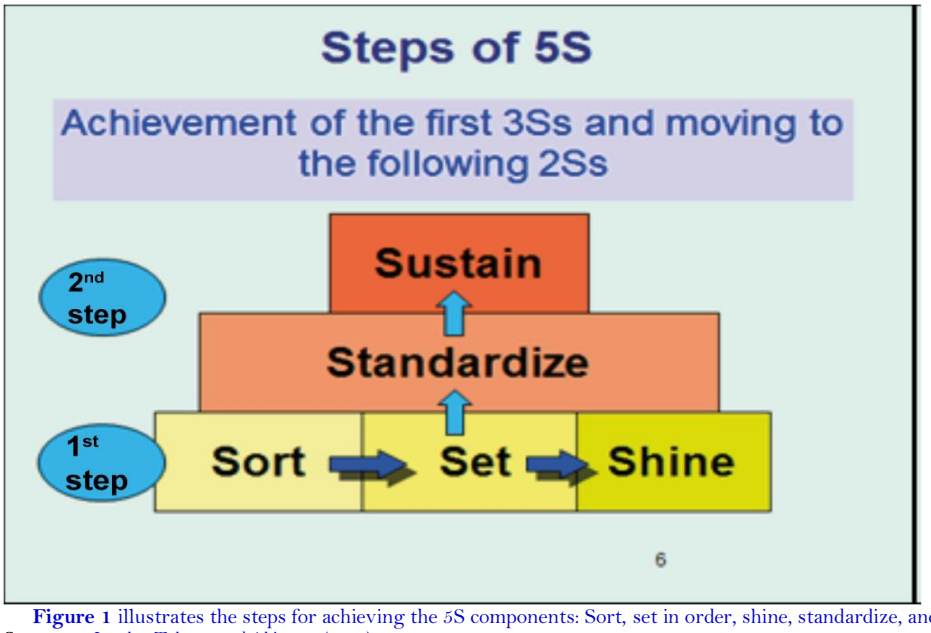

Figure 1 illustrates the steps for achieving the 5S components: Sort, set in order, shine, standardize, and sustain.
Source: Inaoka, Takeya, and Akiyama (2019).

Figure 1 illustrates the steps for achieving the 5S components: Sort, Set in Order, Shine, Standardize, and Sustain.

4.5. The Role of the (5S) System in Healthcare

Improving healthcare quality and safety is a critical challenge, particularly in low- and middle-income countries (Ho et al., 1995). Several quality improvement (QI) initiatives, including the 5S system, have been introduced to train healthcare providers on systematic approaches to enhancing service delivery (Ho et al., 1995).

The implementation of the 5S methodology in healthcare settings has been reported to yield various benefits, including improved organization, efficiency, and safety, reduced waste and costs, enhanced staff motivation and satisfaction, and improved quality of care. However, successful implementation requires commitment from leadership, staff involvement, and continuous efforts. The impact of the application of the 5S management method in the healthcare sector has been documented in the United States, India, Jordan, and Sri Lanka. Despite these findings, there is limited understanding regarding the detailed implementation of the 5S management method and its direct impact on the quality of healthcare services (Kanabar, Piparva, Kanabar, et al., 2024).

4.6. Significance of the (5S) System

1. Managerial Perspective

Motivates managers and staff at all levels to identify cost reduction opportunities and foster continuous improvement processes (Muhammed, 2021).

2. Societal Perspective

Viewed by society as an indicator of a clean, orderly, and well-organized environment, facilitates ease of access and operational flow. Originating in Japan, it emphasizes creating safe and clean workplaces (Kanabar, Piparva, Pandya, Kanabar, & Pharmalecture, 2024).

3. Employee Perspective

Enhances morale, increases efficiency and productivity, improves product quality, and promotes occupational safety while reducing effort, time, and costs (Al-Zahrani, 2011).

4.7. The Five Principles of the (5S) System Hirano and Hirano (1998)

1. Sorting (Seiri)

The initial step involves categorizing all items within the workspace materials, tools, and files by removing unnecessary items. The Red Tag Method is often employed, involving tagging items to identify whether they are needed or should be discarded.

2. Set in Order (Seiton)

Organizing essential items for easy access, arranging them systematically to optimize workflow and efficiency.

3. Shine (Seiso):

Cleaning and inspecting the workspace to maintain cleanliness, identify issues, and promote workplace safety.

4. Standardize (Seiketsu)

Establishing rules and procedures for maintaining organized, clean, and safe work environments, including assigning responsibilities and evaluation standards.

5. Sustain (Shitsuke)

Maintaining and reviewing standards consistently through systematic practices, fostering discipline, and encouraging ongoing improvement.

Although the application of these principles varies across sectors and organizational types, profit, non-profit, private, or public, the dimensions outlined above are critical for assessing their implementation in private hospitals within Latakia Governorate.

4.8. The Practical Study

4.8.1. Design of the Study Tool

The questionnaire was developed based on a thorough review of prior related studies, comprising two sections:

- *Section One:* Demographic information, including gender, age, educational qualifications, years of experience, and job role.
- *Section Two:* Items assessing the implementation levels of (5S) principles, using a Likert scale with appropriate weighting.

Table 1. Division of weights used for questionnaire statements based on the Likert five-point scale.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

Table 1 presents the Division of weights used for questionnaire statements based on the Likert five-point scale.

When the actual mean value exceeds the hypothetical mean of 3, it suggests a positive response trend among the participants, indicating a high level of agreement.

4.9. Evaluation of the Study Tool

The reliability and validity of the questionnaire were assessed using Cronbach's Alpha coefficient, which yielded a value of **0.753**. This indicates acceptable internal consistency and demonstrates that the questionnaire is a reliable instrument for the study.

Table 2. Reliability and validity coefficients for questionnaire statements.

Reliability statistic	
Cronbach s	No of items
0.753	25

Source: Prepared by the researcher based on the outputs of SPSS 25.

Table 2 exhibits Reliability and validity coefficients for questionnaire statements.

4.10. Personal Data Analysis for the Study Sample

4.10.1. Gender Distribution

Analyzing the demographic distribution by gender is a crucial aspect of statistical analysis. It provides insights into the overall characteristics of the sample and helps assess the balance of representation between males and females within the target work environment. The following presents the gender distribution of the study sample.

Table 3. Gender distribution of the sample.

	Gender	Frequency	Percent	Valid Percent	Cumulative percent
	Males	43	37.1	37.1	37.1
Valid	Females	73	62.9	62.9	100
	Total	116	100	100	

The source of the study is from the researcher based on outputs from SPSS 25.

Table 3 shows that females constitute 62.9% of the sample, while males account for 37.1%. This indicates that the workforce in the private hospitals included in this study is predominantly female. The following figure visually illustrates this distribution.

Figure 2 illustrates the distribution of the sample by gender.

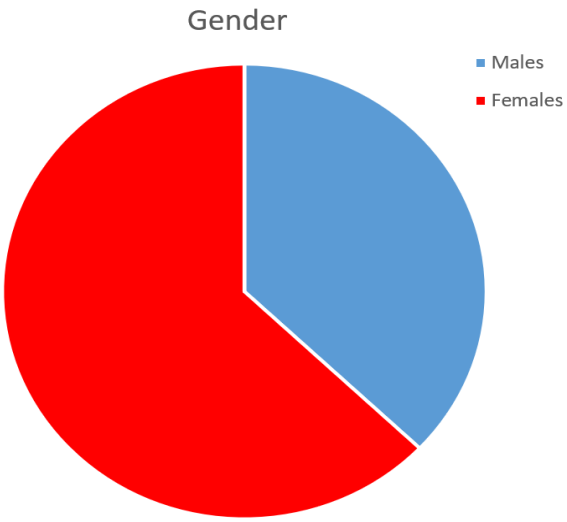

Figure 2 illustrates the distribution of the sample by gender.

- Distribution of the sample by age:

Determining the age group of sample individuals is a key indicator for the study, as illustrated in the table:

Table 4 shows the distribution of the sample according to age:

Table 4. Distribution of the sample according to age.

	Age	Frequency	Percent	Valid percent	Cumulative percent
	Between 20_30 years	45	38.8	38.8	38.8
	Between 31_40 years	46	39.7	39.7	78.4
Valid	Between 41_50 years	16	13.8	13.8	92.2
	Between 51_60 years	6	5.2	5.2	97.4
	More than 60	3	2.6	2.6	100.0
	Total	116	100.0	100.0	

The results indicate that the majority of the sample respondents fall within the age groups of 20 to 30 years (38.8%) and 31 to 40 years (39.7%).

Together, these groups comprise approximately 78.5% of the sample, suggesting that the workforce in private hospitals in Latakia is predominantly young. This may reflect a tendency toward fresh experience or openness to modern quality management systems such as (5S).

Conversely, the older age groups (41 years and above) account for only 21.5% of the total sample, which is consistent with the nature of healthcare work that demands high vitality and up-to-date technological skills. The following figure illustrates this distribution.

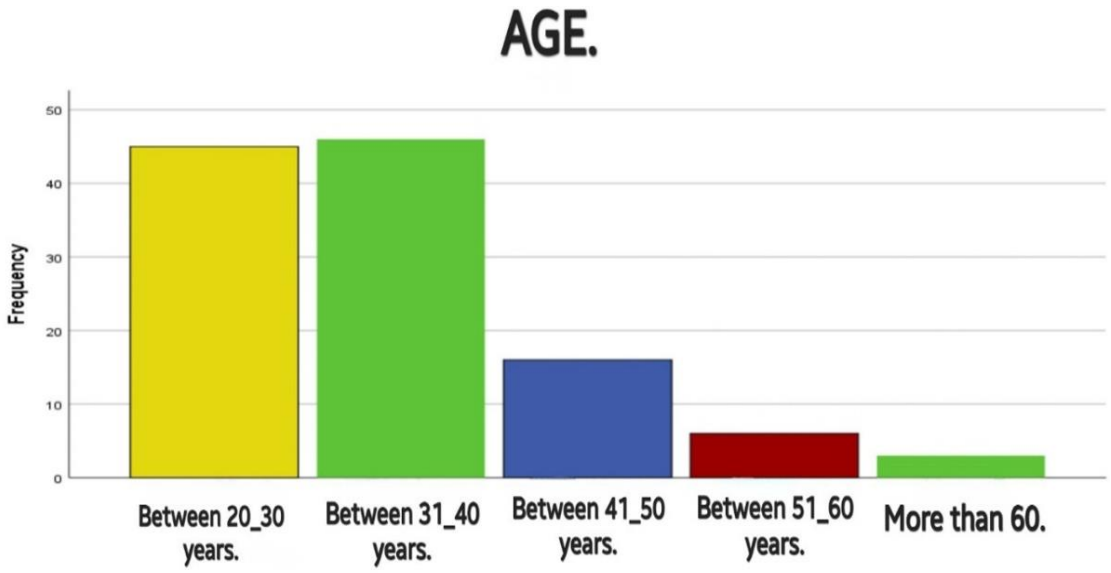

Figure 3 displays the sample's age distribution.

4.11. Sample Distribution Based on Educational Qualifications

The educational level of the sample participants serves as a key indicator for understanding the academic background of staff working in private hospitals in Latakia Province and its potential influence on their acceptance and engagement with modern quality systems, such as (5S). The following table presents the distribution of the sample according to their educational qualifications.

Table 5. The classification of the sample based on various educational levels.

	Educational qualifications	Frequency	Percent	Valid percent	Cumulative percent
Valid	Less than a university degree	37	31.9	31.9	31.9
	University education	66	56.9	56.9	88.8
	Postgraduate studies	13	11.2	11.2	100.0
	Total	116	100.0	100.0	

The Table 5 results indicate that the majority of the sample population holds a university degree, accounting for 56.9%. This is followed by individuals with less than a university education, at 31.9%. Those with postgraduate studies represent the smallest group, at only 11.2%. The graph further illustrates these findings, with Figure 3 depicting the distribution of the sample based on educational qualifications:

Figure 4 shows the distribution of the sample according to educational qualifications:

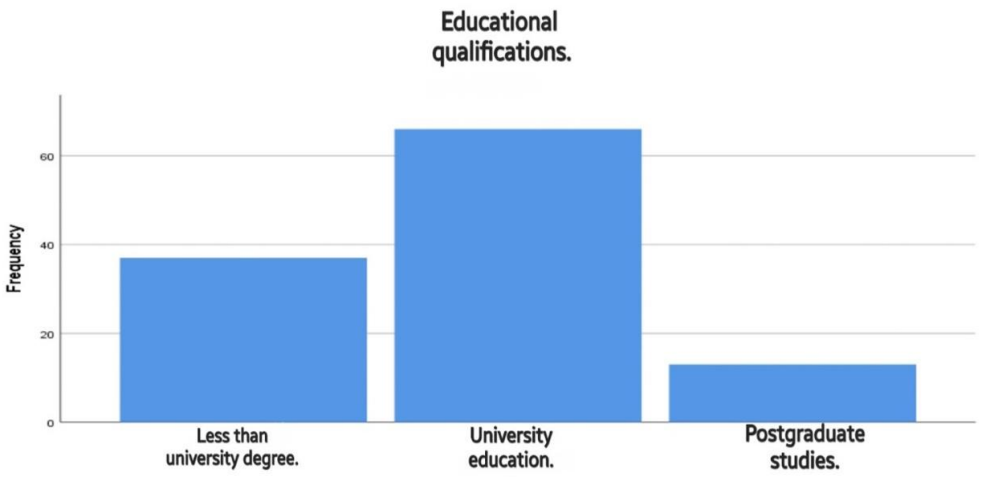

Figure 4. The distribution of the sample according to educational qualifications.

4.12. Distribution of the Sample by Job Experience

Work experience is a significant factor in assessing employees' readiness to implement quality systems such as the 5S system. The number of years in employment reflects the level of practical knowledge and engagement with the work environment and its challenges. The following table presents the distribution of individuals in the sample based on their years of experience working in private hospitals in Latakia province:

Table 6 shows the distribution of the sample according to job experience:

Table 6. The distribution of the sample according to job experience.

	Job experience	Frequency	Percent	Valid percent	Cumulative percent
Valid	Less than 5 years	70	60.3	60.3	60.3
	From 5 years to less than 10 years	27	23.3	23.3	83.6
	From 10 years to less than 15 years	11	9.5	9.5	93.5
	From 15 years to less than 20 years	5	4.3	4.3	97.4
	More than 20 years	3	2.6	2.6	100.0
	Total	116	100.0	100.0	

The data indicates that the vast majority of the sample, 60.3% have less than five years of experience. The next largest group consists of individuals with experience ranging from five to less than ten years, comprising 23.3%. In total, approximately 84% of the workforce has short to medium levels of experience.

In contrast, those with long-term experience (more than 15 years) constitute a small percentage, not exceeding 6.9% of the total sample. The corresponding graph illustrates this distribution.

Figure 5 illustrates the distribution of the sample based on job experience.

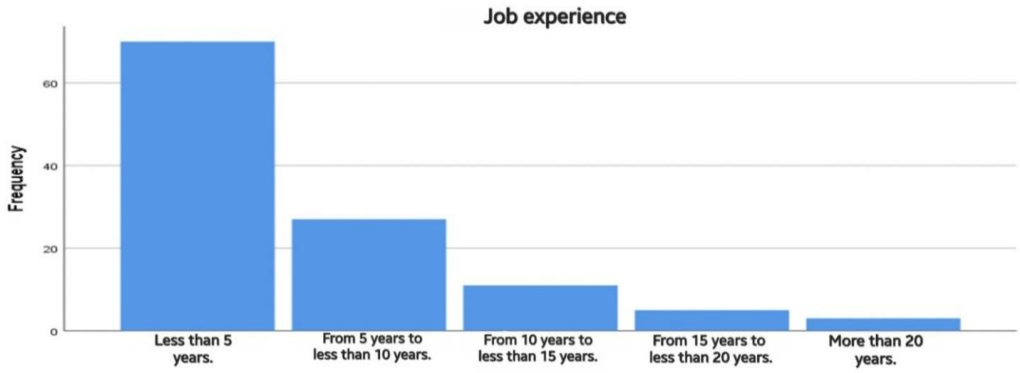

Figure 5. The distribution of the sample based on job experience.

4.13. Distribution of the Sample by Job Position

Job position is a key variable in analyzing individuals' awareness of their responsibilities and their engagement with quality systems, particularly in healthcare institutions that depend on a well-defined organizational structure. The table below presents the distribution of the sample based on the job positions they hold in private hospitals in Latakia Governorate:

Table 7 shows the distribution of the sample according to job position:

Table 7. The distribution of the sample according to job position.

	Job position	Frequency	Percent	Valid percent	Cumulative percent
	General manager	4	3.4	3.4	3.4
	Deputy manager	7	6.0	6.0	9.5
Valid	Department head	35	30.2	30.2	39.7
	Division head	50	43.1	43.1	82.8
	Head nurse	20	17.2	17.2	100.0
	Total	116	100.0	100.0	

The results reveal that most of the sample hold mid-level supervisory roles, with both "Division Heads" and "Department Heads" making up the largest share at 73.3%. The "Head Nurse" category, accounting for 17.2%, is a vital segment within the healthcare system, playing a crucial role in ensuring the quality of clinical services and direct patient care. Meanwhile, those in senior management positions (General Manager and Deputy Manager) constitute a smaller portion, at 9.4%. The following chart illustrates this distribution.

Figure 6 depicts the distribution of the sample according to job positions.

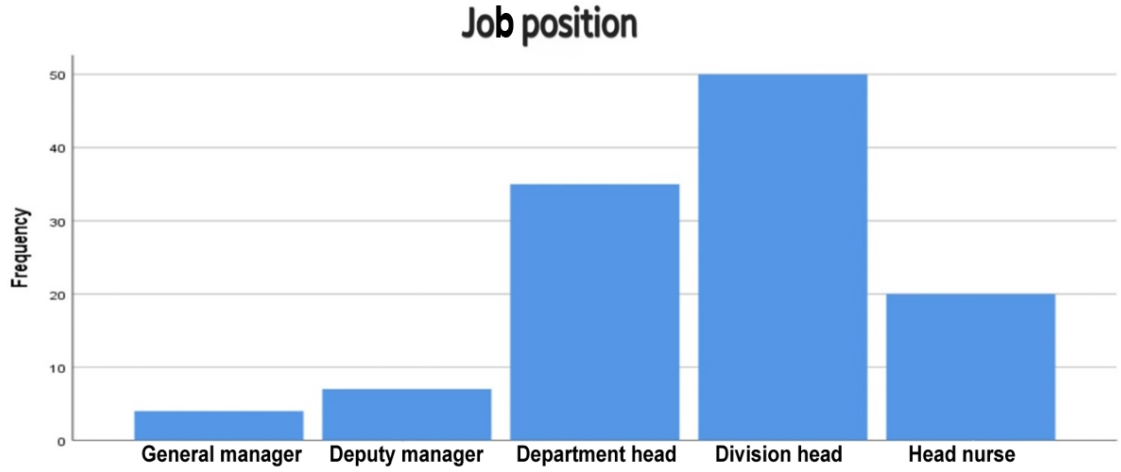

Figure 6. Depicts the distribution of the sample according to job positions.

4.14. Hypothesis Testing

First hypothesis: There is no implementation of the "classification" principle within the 5S system in private hospitals in Latakia Governorate.

Based on the questionnaire data and its statistical analysis, a one-sample t-test was performed to determine whether the average opinions of the sample regarding this principle significantly differ from the neutral value (3). This test aims to evaluate the practical application of the "classification" principle in the environment of private hospitals.

Table 8 presents the results of the one-sample T-test, and based on the statistical analysis results in the table, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. Since the significance value (sig) is less than 0.05, it indicates that there is a meaningful and effective application of the "classification" principle within the 5S system in private hospitals in Latakia Governorate, according to the respondents' opinions.

Table 8. Presents the results of the one-sample T-test.

One-sample test						
Test value=3						
	t	**df**	**Sig.(2-tailed)**	**Mean difference**	**95% confidence in the difference**	**Interval of**
					Lower	**Upper**
Classification principle	32.964	115	0.000	1.2690	1.193	1.345

Based on the statistical analysis results, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. Since the significance value (sig) is less than 0.05, it indicates that there is a meaningful and effective application of the "classification" principle within the 5S system in private hospitals in Latakia Governorate, according to the respondents' opinions.

Second Hypothesis: There is no application of the "sorting and organizing" principle within the 5S system in private hospitals in Latakia Governorate. A one-sample t-test was performed to assess whether the sample's average opinions about this principle significantly differ from the neutral value (3). The results are shown in.

Table 9 presents the results of the one-sample T-test and, based on the statistical analysis results in the table, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. The significance value (sig) is 0.000, which is less than 0.05, indicating a statistically significant difference. Therefore, the principle of "cleaning and shining" is effectively and practically implemented within the 5S system in private hospitals in Latakia Governorate, according to the respondents' opinions.

Table 9. Which presents the One-Sample T-Test results.

One-sample test						
Test value=3						
	t	**df**	**Sig.(2-tailed)**	**Mean difference**	**95% confidence in the difference**	**Interval of**
					Lower	**Upper**
Sorting and organizing principle	42.224	115	0.000	1.2241	1.167	1.282

Based on the statistical analysis, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. The significance value (sig) is 0.000, which is less than 0.05, indicating a statistically significant difference. Therefore, the principle of "cleaning and shining" is effectively and practically implemented within the 5S system in private hospitals in Latakia Governorate, according to the respondents' opinions.

Third Hypothesis: There is no application of the "cleaning and shining" principle within the 5S system in private hospitals in Latakia Governorate. A one-sample t-test was conducted to evaluate whether the sample's average opinions about this principle differ significantly from the neutral value (3). The results are shown in:

Based on the statistical results, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. The significance value (sig) is 0.000, which is less than 0.05, indicating a significant and effective application of the "setting standards" principle within the 5S system in private hospitals in Latakia Governorate, as reported by the respondents.

Table 10 presents the results of the one-sample T-test. Based on the statistical analysis results in the table, the Fourth Hypothesis states: There is no application of the "setting standards" principle within the 5S system in private hospitals in Latakia Governorate. A one-sample T-test was conducted to assess whether the sample's average opinions about this principle significantly differ from the neutral value (3).

Table 10. Displays the one-sample T-test results.

One-sample test						
Test value=3						
	t	**df**	**Sig.(2-tailed)**	**Mean difference**	**95% confidence in the difference**	**Interval of**
					Lower	**Upper**
Cleaning and shining principle	40.431	115	0.000	1.3293	1.264	1.394

Fourth Hypothesis: There is no application of the "setting standards" principle within the 5S system in private hospitals in Latakia Governorate. A one-sample t-test was conducted to assess whether the sample's average opinions about this principle significantly differ from the neutral value (3). The results are summarized in:

The results in Table 11 present the results of the one-sample T-test and based on the statistical analysis results of the table.

Table 11. Presents one-sample T-test results.

One-sample test						
Test Value=3						
	t	**Df**	**Sig.(2-tailed)**	**Mean difference**	**95% confidence in the difference**	**Interval of**
					Lower	**Upper**
Setting standards principle	27.256	115	0.000	1.1603	1.076	1.245

Since the p-value (Sig = 0.000) is less than the significance threshold of 0.05, we reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1). This indicates that there is a genuine and effective application of the "sustaining" principle within the 5S system in private hospitals in Latakia Governorate, based on the opinions of the sample respondents.

Fifth Hypothesis: There is no application of the "sustaining" principle within the 5S system in private hospitals in Latakia Governorate. A one-sample t-test was conducted to determine whether the sample's mean opinions significantly differ from the neutral value (3). The details are shown in.

The details in Table 12 present the results of the one-sample T-test and based on the statistical analysis results of the table.

Table 12. The one-sample T-test results.

One-sample test						
Test value=3						
	t	**df**	**Sig.(2-tailed)**	**Mean difference**	**95% confidence in the difference**	**Interval of**
					Lower	**Upper**
Sustaining principle	36.177	115	0.000	1.3172	1.245	1.389

5. RESULTS AND RECOMMENDATIONS

5.1. Results

1. The study sample was drawn from four private hospitals in Latakia Governorate, with Al Noor Hospital having the largest share, reflecting good representation, while other participants were from Al Hikmah Hospital, the Central Hospital, and Sayyida Hospital.
2. Female participants outnumbered males, indicating a predominantly female work environment in these hospitals.
3. Most respondents belonged to the young and middle-aged groups, with fewer individuals above forty, consistent with healthcare's demand for vitality.

4. The majority held university degrees, with others possessing postgraduate or non-university qualifications, indicating a balance of academic and practical skills.
5. Most participants had short to medium work experience, suggesting workforce renewal and dynamism.
6. Job positions mainly included middle supervisory roles such as Department and Division Heads, with fewer in senior management, aligning with where the 5S system is most practically applied.
7. Hypothesis testing demonstrated a significant and effective application of the "classification" principle within the 5S system.
8. The "sorting and organizing" principle was effectively implemented, indicating organized work environments facilitating easy access to tools.
9. The "cleaning and shining" principle was strongly applied, reflecting high standards of cleanliness and quality.
10. The "setting standards" principle was actively applied, demonstrating ongoing efforts to establish uniform procedures.
11. The hospitals demonstrated a commitment to continuous 5S principles, integrating them into organizational culture rather than temporary measures.

5.2. Recommendations

1. Promote and replicate Al Noor Hospital's successful 5S practices as a model for other private hospitals.
2. Support and empower female staff through specialized training to enhance leadership and improve the work environment.
3. Focus on recruiting and continuously developing young staff to strengthen skills and align with quality and sustainability goals.
4. Regularly review and update standards to reflect modern healthcare practices and evolving service needs.
5. Encourage personal and departmental initiatives to improve the work environment, supported by incentives and recognition.
6. Establish committees to monitor 5S implementation, measure progress, and ensure sustained performance.
7. Expand the 5S application to all hospital departments, beyond clinical and service units.
8. Share success stories from hospitals with positive 5S outcomes to motivate staff and demonstrate system effectiveness.

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Institutional Review Board Statement: The Ethical Committee of Al-Andalus University for Medical Sciences, Syria has granted approval for this study on 15 December 2024 (Ref. No 798/1/o.i.).
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
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