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Effective Management of Therapeutic Nutrition Services and their Role in Enhancing the Quality of Health Care Performance at Al-Jalaa Children's Hospital Tripoli - Libya

Naji Abdulsalam Ishkartu[1], Mohammed Ismail Abosalah[2*], Amira Mohamed Amar Tantoush[3], Alaeddin Mohamad Ramadan Alhebshi[4], Nada Albasheer Alhemaly[5]
[1,2]Department of Health Management, Faculty of Health Sciences, Alasmarya Islamic University, Zliten - Libya
[3]Health Services and Hospitals Department Specialist, Health Services administration, Janzour, Libya
[4]Libyan Authority for Scientific Research, Tripoli, Libya
[5]Department of Public Health, Faculty of Medical Technology, University of Tripoli, Libya

الإدارة الفعالة لخدمات التغذية العلاجية ودورها في تحسين جودة أداء الرعاية الصحية في مستشفى الجلاء للأطفال طرابلس – ليبيا

ناجي عبد السلام إشكارطو[1]، محمد إسماعيل أبوصلاح[2*]، أميرة محمد تنتوش[3]، علاء الدين محمد الحبشي[4]، ندي البشير الهمالي[5]
[1،2]قسم الإدارة الصحية، كلية العلوم الصحية، الجامعة الأسمرية الإسلامية، زليتن، ليبيا
[3]أخصائية إدارة الخدمات الصحية والمستشفيات، إدارة الخدمات الصحية، جنزور، ليبيا
[4]الهيئة الليبية للبحث العلمي، طرابلس، ليبيا
[5] قسم الصحة العامة، كلية التقنية الطبية، جامعة طرابلس، ليبيا

*Corresponding author: m.abosalah@asmarya.edu.ly

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Abstract:
Effective management of clinical therapeutic nutrition services is an integral part of modern healthcare, providing tremendous added value to the quality of healthcare provided by improving clinical outcomes for patients and achieving economic viability in hospitals and healthcare institutions. The study aimed to evaluate the level of effective management practices for therapeutic nutrition services provided and their impact on the quality of health care provided to the disease at the Children's Hospital in Tripoli. The descriptive analytical approach was used to evaluate the performance of effective management of nutrition services. Data were collected through a questionnaire prepared according to the Likert triple scale. Descriptive statistics, proportions, frequency, arithmetic mean, inferential statistics, T-test, ANOVA, and Pearson's coefficient were used. The results of the study showed that the level of management of therapeutic nutrition services at Al-Galaa Children's Hospital was moderate and lower than expected, which confirms the existence of a quality gap that requires urgent administrative interventions. The study also demonstrated that the effectiveness of therapeutic nutrition service management significantly impacts the dimensions of healthcare quality, namely responsiveness, reliability, safety, concreteness, and empathy. Conclusion shows that clear weaknesses in the infrastructure and physical and logistical equipment, particularly in the concrete dimension, which recorded the lowest levels of quality. And confirmed that human resource development and increasing the number and training of specialists are key factors in improving service efficiency and achieving patient and family satisfaction. Recommendations that enhancing the effective management of

therapeutic nutrition services, along with investing in human resources and digital technologies, is a key approach to addressing existing gaps and achieving excellence in hospital healthcare performance.

Keywords: Healthcare Management, Quality of Healthcare Services, Therapeutic Nutrition Services, Tripoli, Libya.

الملخص:

تعد الإدارة الفعالة لخدمات التغذية العلاجية السريرية جزءًا لا يتجزأ من الرعاية الصحية الحديثة، مما يوفر قيمة مضافة هائلة لجودة الرعاية الصحية المقدمة من خلال تحسين النتائج السريرية للمرضى وتحقيق الجدوى الاقتصادية في المستشفيات ومؤسسات الرعاية الصحية. هدفت الدراسة إلى تقييم مستوى ممارسات الإدارة الفعالة لخدمات التغذية العلاجية المقدمة وأثرها على جودة الرعاية الصحية المقدمة للمرضي في مستشفى الأطفال بطرابلس. تم استخدام المنهج ا الوصفي التحليلي لتقييم أداء الإدارة الفعالة لخدمات التغذية. تم جمع البيانات من خلال استبيان تم إعداده وفق مقياس ليكرت الثلاثي. تم استخدام الإحصاء الوصفي، النسب، التكرار، والمتوسط الحسابي، والإحصاء الاستدلالي، اختبار T، ANOVA، ومعامل بيرسون. أظهرت نتائج الدراسة أن مستوى إدارة خدمات التغذية العلاجية في مستشفى الجلاء للأطفال كان معتدلاً وأقل من المتوقع، مما يؤكد وجود فجوة نوعية تتطلب تدخلات إدارية عاجلة. وأظهرت الدراسة أيضًا أن فعالية إدارة خدمات التغذية العلاجية تؤثر بشكل كبير على أبعاد جودة الرعاية الصحية، وهي الاستجابة والموثوقية والسلامة والواقعية والتعاطف. الخلاصة: نقاط ضعف واضحة في البنية التحتية والمعدات المادية واللوجستية، خاصة في البعد الملموس الذي سجل أدنى مستويات الجودة. وأكد أن تنمية الموارد البشرية وزيادة عدد وتدريب المتخصصين من العوامل الأساسية في تحسين كفاءة الخدمة وتحقيق رضا المرضى واسرهم. توصي هذه الدراسة بأن يتم تعزيز الإدارة الفعالة لخدمات التغذية العلاجية، إلى جانب الاستثمار في الموارد البشرية والتقنيات الرقمية، هو نهج رئيسي لمعالجة الفجوات القائمة وتحقيق التميز في أداء الرعاية الصحية في المستشفى.

الكلمات المفتاحية: إدارة الرعاية الصحية، جودة خدمات الرعاية الصحية، خدمات التغذية العلاجية، طرابلس، ليبيا.

Introduction:

The field of clinical nutrition is witnessing rapid development as an integral part of the modern healthcare system, as therapeutic strategies are moving towards continuous improvement driven by innovations in medical concepts and technologies (Erickson et al., 2023). Clinical nutrition is a biomedical specialty that requires a comprehensive and practical guide to apply it in medical practice, given its essential role in disease management and promoting recovery (Barker et al., 2011). Fact-based evidence has demonstrated that nutritional interventions provide tremendous added value to healthcare, not only by improving clinical outcomes for patients, but also by achieving economic viability for healthcare institutions (Tappenden et al., 2013) . In this context, studies indicate that medical nutritional therapy (MNT) provided by nutritionists is highly effective and directly contributes to reducing health care costs, especially in the management of chronic diseases (Hakel-Smith, 2004).

Effective management of therapeutic nutrition services is an essential pillar of the modern healthcare system, as it has gone beyond its traditional concept as hotel services to become an integral part of the comprehensive treatment plan that aims to improve clinical outcomes for patients and achieve operational efficiency of healthcare institutions (Barker et al., 2011; Erickson et al., 2023; Tappenden et al., 2013). In light of global shifts towards healthcare models that focus on value and quality, hospitals are required to adopt integrated management methodologies that ensure the provision of safe and effective nutritional care, based on careful strategic planning and the tight organization of human and material resources (Hakel-Smith, 2004) . Recent literature indicates that integrating therapeutic nutrition into Total Quality Management (TQM) programs directly contributes to reducing medical complications, lowering mortality rates, and shortening patients' hospital stays, which positively reflects on the financial sustainability of health institutions by rationalizing expenses and improving family turnover (Abosalah et al., 2025).

Despite this importance, nutrition services management faces organizational and operational challenges. To ensure quality of care, implementing the Nutritional Care Process (NCP) and standardizing its terminology is an essential step to enhance communication between providers and improve outcomes (Sulo et al., 2020). However, the practical application of this process faces multiple obstacles; evaluation studies have revealed challenges related to documentation and training (Sikand et al., 2023) . in addition to the implementation being affected by individual and contextual factors that require a precise understanding of the work environment (Lövestam et al., 2024). To achieve excellence in food support units, there must be clear regulatory frameworks and regulations that define responsibilities and ensure the safety and effectiveness of the care provided (Lesmes, 2021).

Nutritional care becomes increasingly complex in critical situations, requiring careful review of the medical literature and complex, ongoing clinical decision-making (Lambell et al., 2020) . Here the gap

between written policies and the actual performance of services appears, a gap that can be bridged through critical analysis of work team efficiency factors (da Silva et al., 2021) . and the use of information technology as a tool to link policies to practical application (Cho et al., 2021).

In response to these challenges, digital transformation is emerging as a pivotal strategic solution. Needs analysis for digital transformation emphasizes the need to integrate technical systems to develop the nutritional care process (Jannah et al., 2023). Today we live in the "age of artificial intelligence," which enables the integration of digital technology from mobile applications to wearable tools to accurately collect and analyze data, supporting clinical decision-making (Limketkai et al., 2021) . These digital applications offer tremendous possibilities for diet monitoring and accurate personalized planning (Precision Nutrition) for both patients and professionals).Abeltino et al., 2025 (

Moreover, modern digital platforms specializing in evidence-based clinical nutrition (Evidence-based Clinical Nutrition) have demonstrated high usability, enhancing the accuracy of medical practices and facilitating access to reliable information (Huwiler et al., 2025). This trend towards precise nutritional management, supported by digital tools, is a key pillar for improving patient care across a wide spectrum of diseases (Karayiannis & Poulia, 2025). From this perspective, this study examines the effective management of therapeutic nutrition services at Al Galaa Children's Hospital, aiming to explore ways to enhance the quality of healthcare by adopting modern management methodologies and innovative digital solutions.

Based on the above, there is an urgent need to assess the reality of these services in specific local contexts to understand existing gaps and ways to address them, particularly in children's hospitals that require precise and sensitive nutritional care. Accordingly, this study seeks to assess the level of effective management of therapeutic nutrition services and reveal their pivotal role in enhancing the quality performance of healthcare services provided at Al-Galaa Children's Hospital. The study aims to present a proposed framework for developing these services in line with international standards, thus contributing to bridging the knowledge gap in this field at the local and Arab levels.

Research Problem:

The research problem focuses on trying to determine what administrative requirements (such as policies, human resources, allocation of financial resources, and training) are necessary to raise the efficiency and effectiveness of therapeutic nutrition services, and how they can be applied to maximize the positive impact of those services on hospital operational performance indicators (such as patient survival rate in the hospital and treatment cost).

Research Questions:

1. What is the reality of the current administrative requirements (in terms of policies, human and financial resources, and work procedures) for providing therapeutic nutrition services in the hospital under study?
2. What is the level of efficiency and effectiveness of the operational management of therapeutic nutrition services from the perspective of health and administrative staff?
3. Is there a statistically significant relationship or effect between the adequacy of specialized human resources (nutritionists) and the level of availability and quality of therapeutic nutrition services?
4. What is the role of the availability and quality of therapeutic nutrition services, in accordance with improved administrative requirements, in improving hospital operational performance indicators (such as reducing average patient length of stay (LOS) or readmission rates)?

Study objectives:

1. Determine the level of effective management practices for therapeutic nutrition services (in terms of planning, organization, and implementation) at Al-Jalaa Children's Hospital/Tripoli under study.
2. Evaluating the level of performance and quality of health care services provided at Al-Jalaa Children's Hospital/Tripoli, through its five dimensions (response, reliability, security, tangibility, empathy).
3. Measure and analyze the role of effective management of therapeutic nutrition services as an independent variable in enhancing the quality performance of health care services as a dependent variable in the hospital.

Research Hypotheses:

In light of the problem and objectives of the study, the research hypotheses were reformulated as follows, focusing on the relationship between effective management of supportive services (therapeutic nutrition) and service quality performance (SERVQUAL dimensions) in a specialized healthcare setting:

The first main research hypothesis: The statistical impact of therapeutic nutrition services on overall quality

The first main hypothesis is formulated to test the effect of an independent variable (therapeutic nutrition services) on the dependent variable (quality of services), which is fundamental in evaluating hospital administrative processes:

The first main research hypothesis:

There is a statistically significant effect of the effectiveness and efficiency of therapeutic nutrition services on the overall level of the quality of health care services provided at Al-Jalaa Children's Hospital/Tripoli, at the significance level (P≤0.05).

Sub-hypotheses: Impact on quality dimensions (SERVQUAL):

These hypotheses aim to break down the overall impact into its five detailed dimensions of service quality (SERVQUAL), providing health management with accurate insights into which aspects of quality are most affected by therapeutic nutrition.

The first sub-hypothesis:

There is a statistically significant effect of therapeutic nutrition services on the response dimension (Responsiveness) of the quality of health care services at the significance level (P≤0.05) in the hospital under study. (How quickly and efficiently the hospital responds to nutritional needs)

Second sub-hypothesis:

There is a statistically significant effect of therapeutic nutrition services on the reliability dimension (Reliability) of the quality of health care services at the significance level (P≤0.05) in the hospital under study. (The accuracy and reliability of providing meals and feeding plans according to medical standards).

Third Sub-hypothesis:

There is a statistically significant effect of therapeutic nutrition services on the safety dimension (Assurance) of the quality of health care services at the significance level (P≤0.05) in the hospital under study. (The extent to which patients and their families are provided with confidence and safety regarding food safety standards and the technical expertise of the feeding staff).

Fourth sub-hypothesis:

There is a statistically significant effect of therapeutic nutrition services on the tangibility dimension (Tangibles) of the quality of health care services at the significance level (P≤0.05) in the hospital under study. (The effect of the physical appearance of catering facilities, meal cleanliness, and equipment used**).**

The Fifth Sub-hypothesis:

There is a statistically significant effect of therapeutic nutrition services on the empathy dimension (Empathy) of the quality of health care services at the significance level (P≤0.05) of the hospital under study. (The extent to which the therapeutic nutrition team cares about the individual needs of the sick child and his family and provides personal care).

The second main research hypothesis: assessing the overall quality level:

The actual level of quality of health care services provided at Al-Jalaa Children's Hospital/Tripoli is lower than the hoped-for or acceptable level (standard), at the significance level (P≤0.05), which indicates the existence of a quality gap that requires administrative intervention.

Methodology:

Study Design:

The study adopted the descriptive analytical approach, which is based on collecting accurate data about the study variables, then classifying them, processing them statistically, and interpreting their results, with the aim of describing the correlation and mutual impact between the efficiency of nutritional services and health care quality indicators.

Sample and study population:

The study population consisted of all health service providers directly related to the provision of therapeutic nutrition and medical care services at Al-Jalaa Children's Hospital in Tripoli, specifically the categories of doctors and therapeutic nutrition specialists present during the study period. The comprehensive framework of the research population was defined as (320) individuals, based on official data and statistics extracted from the records of the Human Resources Department and the Hospital's Personnel Affairs. In order to select a sample that is accurately and objectively representative of the population, the determinants were resorted to the statistics contained in the Krejcie & Morgan table (Krejcie & Morgan), and accordingly the optimal sample size was determined at (175) individuals. The study adopted the simple random sampling method (Simple Random Sampling) as a selection mechanism with the aim of giving all individuals in the population equal opportunities to appear within the sample, which enhances the reliability of the results and the possibility of their generalization. To ensure obtaining the minimum required responses and to cover any potential loss or lack of cooperation, (185) questionnaire forms were distributed to the targeted individuals. The field work and office sorting process resulted in the retrieval of (153) forms with complete data and valid for statistical processing, achieving a response rate of approximately (83%). These valid responses were distributed as follows: (141) forms for the category of doctors and (12) forms for the category of therapeutic nutritionist, which constitutes a sufficient database to conduct the necessary analyses and test the study hypotheses .

Data collection:

Data collection tools:

The study adopted the controlled questionnaire as the main tool for collecting primary data, as its structure was designed to include demographic and functional data of the respondents, with a focus on measuring effective management practices as an independent variable with its planning, organizational, control, and human resources development dimensions, and linking their impact to the dependent variable represented by health care quality performance across its five dimensions of responsiveness, reliability, safety, tangibility, and empathy.

The study's objective limitations are to investigate the impact relationship between effective management of therapeutic nutrition services and health care quality performance in its five dimensions (response, reliability, security, tangibility, and empathy).

Data analysis:

For the purpose of processing the primary data and drawing accurate conclusions that serve the objectives of the study, the Statistical Software Package for the Social Sciences (SPSS) version 23 was relied upon as the main analysis tool. The data were analyzed using descriptive statistics (frequency distributions and percentages, measures of central tendency and dispersion represented by arithmetic means and standard deviations) to determine the level of homogeneity and variance in opinions. The measurement tool was subjected to data quality tests, using the "Cronbach's alpha" coefficient to estimate the tool's stability and internal consistency, in addition to the Pearson correlation coefficient to verify Constructive validity and measuring the strength of correlational relationships between variables. to complement the analytical methodology, we moved to the realm of inferential statistics to test research hypotheses, by applying the single-sample (One-Sample T-Test) test to compare the achieved averages with the hypothetical media, and employing simple linear regression analysis (Simple Linear Regression) to reveal the nature of the effect and statistical significance of the independent variable represented by the effective management of therapeutic nutrition services on the dependent variable concerned with the quality of health care.

Scale of Measurement:

To analyze the study data and accurately measure the respondents' attitudes towards the research axes, the "Triple Likert Scale" (3-Point Likert Scale) was adopted as a standard measurement tool to determine the degree of agreement with the paragraphs. For the purposes of statistical processing and converting qualitative data into measurable quantitative indicators, a graded weight coding system was adopted for the options, where the score (3) for the response "OK" was assigned to express the upper limit of positivity, the score (2) for the response "Somewhat OK" to represent relative neutrality, and the score (1) for the response "Disagree" to present the minimum. To interpret the values of arithmetic averages weighted and determine the general trend level (high, medium, low), the class length (Class Interval) was determined based on the range equation, by dividing the difference between the highest and lowest value in the scale by the number of classes used, which resulted in a class length of approximately (0.67). Based on this, a standard matrix was adopted to judge the results; the arithmetic mean, which falls in the range between (1.00 to 1.66), is classified as a low level that reflects disagreement, while the range between (1.67 to 2.33) indicates an average level of agreement While the arithmetic mean, which falls within the category (2.34 to 3.00), is an indicator of a high level of approval and support for the content of the research paragraph.

Results:

Presentation and analysis of basic data aimed at identifying the demographic and functional characteristics of the study sample.

Table (1): Frequency and relative distribution of demographic and functional characteristics of the study sample

variable	Category	Frequency	percent(%)
gender			
	male	26	17,0
	female	127	83,0
age			
	under 30	46	30,0
	From 30 years - less than 40 years	80	52,3
	From 40 years - less than 50 years	18	11,8
	From 50 years and over	9	5,9
educational qualification			
	master's	9	5,9
	University (Bachelor)	133	86,9
	Doctorate	11	7,2
scientific specialization			

	Physician	141	92,2
	Therapeutic nutritionist	12	7,8
Years of experience			
	Less than 5 years	56	36,6
	From 5 years to less than 15 years	37	24,2
	From 15 years to less than 25 years	34	22,2
	From 25 years and over	26	17,0

Analysis of the demographic and functional characteristics of the study sample:

The results showed that the majority of the sample members were women, at a rate of 83.0%, compared to 17.0% for males. The largest percentage was concentrated in the middle age group (from 30 to less than 40 years) at 52.3%, followed by the youth group (under 30 years) at 30.0%.

Presentation and analysis of primary data related to study variables:

Effective management of therapeutic nutrition service:

Table (2): Arithmetic mean and standard deviation of the independent variable items (effective management of therapeutic nutrition services).

N	Statement	Arithmetic mean	standard deviation	level of approval
1	Health-specific meals are planned for each sick child.	2.28	0.905	**2**
2	The doctor and the therapeutic nutritionist plan meals to reduce the complications of the disease for the sick child.	2.52	0.877	3
3	Evaluation of the health condition by the treating physician and therapeutic nutritionist is the deciding factor in determining the sick child's nutritional needs.	2.46	0.877	3
4	The therapeutic nutritionist provides the companion with the sick child with a nutritional plan specific to his health condition that suits him for life.	2.25	0.840	2
5	The effect of the diet on the health of the sick child is monitored for a certain period, after which the diet is continued or stopped.	2.06	0.888	2
6	Record the results of the therapeutic nutritional plan developed by the therapeutic nutritionist for the sick child and discuss them with the treating physician.	2.50	0.870	3
7	The doctor and therapeutic nutritionist will be informed if the child is allergic to any type of food offered to him.	2.43	0.874	3
8	Clarifying the diseases that the sick child suffers from to the treating physician and therapeutic nutrition specialist facilitates the way for them to develop a sound nutritional treatment plan for what the sick child needs.	2.38	0.874	3
9	Strictly adhere to the foods that the doctor and therapeutic nutritionist prohibit for the sick child.	2.48	0.877	3
10	The hospital kitchen is equipped with a sufficient number of modern appliances, equipment and tools, which leads to the completion of work on time, taking into account the appropriate cost and the level of cooking that is delicious and acceptable to patients.	2.03	0.832	2
11	Meals are transported and distributed to patients in containers equipped to maintain a suitable eating temperature.	2.26	0.920	2
12	Requiring workers to wear their uniforms and wear medical gloves to reduce food contamination.	2.40	0.897	3
13	Cleaning is done periodically and regularly, following the latest methods and means in the field of sterilization and hygiene.	2.36	0.897	3
14	The space is suitable for preparing and distributing meals to patients.	2.18	0.903	2
15	Attention is paid to measuring temperatures to ensure that prepared foods do not spoil, and distributing meals to patients.	2.15	0.893	2
16	Specialists conduct an almost daily survey to evaluate diets from the perspective of patients' companions, and to note any impact on the health of sick children.	2.13	0.859	2
17	The therapeutic nutritionist supervises and reviews the meals provided to patients.	2.22	0.891	2
18	The treating physician and therapeutic nutritionist provide all information about the health condition of the sick child to the companion so that he is aware of the patient's health condition.	2.40	0.903	3
19	Interest in responding to the inquiries of the sick child and his companion with open arms.	2.34	0.897	3
General arithmetic average		**2,31**	**0,795**	**2**

Quality of healthcare services:

To know the level of quality of health care services in the hospital under study, the arithmetic mean and standard deviation were calculated for each dimension of this variable separately, and the following table (3) shows arithmetic mean and standard deviation:

Table (3): Arithmetic mean and standard deviation of the dimensions of the dependent variable (quality of health care services)

N	Statement	Arithmetic Mean	Standard Deviation	Quality Level
1	There are emergency services ready for urgent cases.	2,10	0.888	2
2	Doctors are always available, ready to help patients quickly.	2,25	0,899	2
3	The hospital provides its services to meet patients wherever they are, inside or outside it.	1,64	0,975	1
4	The physician and therapeutic nutritionist respond immediately to patients' inquiries.	2,05	0.867	2
5	The procedures are easy and simplified in providing health services.	2,15	0.903	2
General arithmetic mean of the response dimension		**2,00**	**0,837**	**2**
6	There are enough doctors available to provide assistance to patients and visitors.	1,60	0.971	1
7	The trust factor exists between the doctor and the therapeutic nutritionist on the one hand and the patient on the other hand.	2.12	0,888	2
8	There is a feeling among patients that they can always rely on doctors and therapeutic nutritionists.	2,08	0,971	2
9	The hospital adheres to the appointments given to patients to provide the health service required of them.	2,30	0.933	2
10	Doctors and therapeutic nutritionists provide accurate and almost error-free services.	2,13	0.992	2
11	Providing comprehensive health services to sick children in all medical specialties.	1,66	0,932	1
General arithmetic mean of the reliability dimension		**1,98**	**0,814**	**2**
12	Patient information is strictly confidential and is not shared with anyone.	2,20	0,883	2
13	The patient feels safe and confident when dealing with the doctor and the hospital's therapeutic nutritionist.	2,00	0,833	2
14	Be kind and gentle with sick children to build a bridge of trust to connect with them.	2,10	0,911	2
25	There is no discrimination between patients when providing health services.	2,15	0,917	2
16	Respect the patient's privacy and ensure the confidentiality of his health information.	1,80	0,939	2
General arithmetic mean of the safety dimension		**2.05**	**0,755**	**2**
17	The hospital provides modern medical equipment and devices, medicines and medical supplies.	1,44	0,891	1
18	Doctors and therapeutic nutritionists take care of their external appearance by wearing their own uniform.	1,74	0.921	2
19	The hospital has lounges for sick children where they can sometimes play or watch TV.	1,30	0.847	1
20	Clean, usable restrooms are available for sick and accompanying children.	1,72	0,921	2
21	The hospital's location is convenient, well-known and easily accessible to everyone.	1,92	0.905	2
22	The hospital has signboards that facilitate access for patients.	1,68	0,859	2
General arithmetic mean of the tangibility dimension		**1,63**	**0,766**	**1**
23	Each patient receives special attention upon admission to the hospital.	1,80	0,816	2
24	The patient's priority is always given to the physician and therapeutic nutritionist.	1,88	0,850	2
25	The physician and therapeutic nutritionist clearly know and understand the patient's need and desire.	2,00	0,899	2
26	The behavior of the doctor and therapeutic nutritionist is characterized by tact in dealing with sick children and their families in the hospital.	2,04	0,853	2
27	Welcoming and listening to patients' complaints, and striving to address problems quickly.	1,98	0,971	2
General arithmetic mean of the empathy dimension		**1,94**	**0,764**	**2**
General arithmetic mean of the dependent variable (quality of health care services)		**1,92**	**0,652**	**2**

Third: Testing the study hypotheses:

When testing the study hypotheses, the rules followed are determined as follows:

1. The morale level (indicative) for this study is equal to (0.05), and the degree of confidence used in this study is (95%).
2. The test was conducted by comparing the significance level of this study, which is equal to (0.05), and the value of the significance level. Based on this, the null hypothesis is rejected and the alternative hypothesis is accepted if the value of the observed significance level is less than the significance level of this study (0.05) and vice versa.

Displaying the results of simple linear regression analysis:

Simple linear regression analysis was used to verify the positive impact of effective management of therapeutic nutrition services (independent variable) on operational performance and quality of

healthcare services (dependent variable), and the statistical decision rule was determined by adopting a significance level ***(P−VALUE)*** of 0.05 and a confidence score of 95%.

Table (4): The overall impact of effective nutrition management on the quality of health care

Statement	Correlation Coefficient (R)	Coefficient of Determination (R2)	Test F	Viewer Morale Level (P−Value)
The Overall Impact of The Model	0,813	0,662	74,325	0,000

Overall impact on health care Quality:

The results of the overall impact test of the model (Table 4) show a very strong direct correlation between the two variables, as the value of the correlation coefficient (R) was about 0.813. Administratively, this value indicates a clear correlation and consistency between the efficiency of the administrative processes of the nutrition department and the perceived level of quality in health care.

In support of this result, the value of the coefficient of determination (R^2), which amounted to 0.662, showed high explanatory power for the model, as (66.2%) of the variance and changes in the level of health care quality were attributed to the effectiveness of the management of therapeutic nutrition services, while the remaining percentage was attributed to other factors outside the scope of this model and random error. From a health management perspective, the ability of support services such as nutrition to explain more than two-thirds of the variance in overall quality is conclusive evidence of their strategic centrality in the hospital's total quality management process .

The statistical significance of the model and its predictive validity were also confirmed by the calculated value (F) which was 74.325, with a significance level of 0.000. Because this probability value is less than the permissible limit (P = 0.05), the study concludes by rejecting the null hypothesis and accepting the alternative hypothesis, thus confirming the existence of a statistically significant positive effect of effective management of therapeutic nutrition services on increasing the performance and quality of health care. Testing the first sub-hypothesis, which states: There is a statistically significant effect of therapeutic nutrition services in responding to the quality of health care services in the hospital under study.

Table (5): Linear regression analysis to find the impact of therapeutic nutrition services on the "response" to the quality of health care services

statement	Correlation coefficient (R)	Coefficient of determination (R2)	F test	Viewer Morale Level (P−VALUE)
The impact of therapeutic nutrition services on the response to the quality of health care services	0,671	0,450	31,137	0,000

It is clear from the previous table that the value of the correlation coefficient is equal to (0.671) with a positive sign. This indicates that the relationship between (therapeutic nutrition services) and (response to the quality of health care services) is a direct relationship, meaning that the higher the level of (therapeutic nutrition services), the higher the level of (response to the quality of health care services) (and vice versa). Also, the coefficient of determination (R^2) is equal to (0.450) This means that therapeutic nutrition services are responsible for explaining (45%) of the changes that occur in (response to the quality of health care services), and that (55%) is due to other factors, in addition to the limit of random error. Since the value of (F) of the viewer is equal to (31.137) with a significance level of (0.000) *, less than (0.05), this indicates that the model is significant in interpreting the relationship and measuring the impact, which means that it is possible to rely on the regression equation .This confirms and supports the hypothesis that: There is a statistically significant effect of therapeutic nutrition services on the response to the quality of health care services in the hospital under study.

Testing the second sub-hypothesis, which states: There is a statistically significant effect of therapeutic nutrition services on the reliability of the quality of health care services in the hospital under study. Linear regression of the effect of effective management of therapeutic nutrition services in enhancing reliability as a dimension of quality performance:

For the purpose of testing the sub-hypothesis that states: There is a statistically significant effect of effective management of therapeutic nutrition services in enhancing the reliability (Reliability) of the quality of health care services of the hospital under study, simple linear regression analysis was applied. Effective management of therapeutic nutrition services was considered as an independent variable, and reliability (the first dimension of health care service quality) as a dependent variable.

Table (6): Linear regression analysis to find the impact of effective management of therapeutic nutrition services on the reliability of the quality of health care services

Statement (Tested Relationship)	Correlation Coefficient R	Determination Coefficient R2	F Test	Viewer Morale Level
The impact of therapeutic nutrition services on the reliability of the quality of health care services	0,691	0,477	34,688	0,000

It is clear from the previous table that the value of the correlation coefficient is equal to (0.691) with a positive sign. This indicates that the relationship between (therapeutic nutrition services) and (dependency on the quality of health care services) is a direct relationship, meaning that the higher the level of (therapeutic nutrition services), the higher the level of (dependency on the quality of health care services) (and vice versa). Also, the coefficient of determination (R^2) is equal to (0.477) This means that therapeutic nutrition services are responsible for explaining (47.7%) of the changes that occur in (reliance on the quality of health care services), and that (52.3%) of this is due to other factors, in addition to the limit of random error. Since the value of (F) of the viewer is equal to (34.688) with a significance level of (0.000) *, less than (0.05), this indicates that the model is significant in interpreting the relationship and measuring the impact, which means that it is possible to rely on the regression equation.

This confirms and supports the hypothesis that: There is a statistically significant effect of therapeutic nutrition services on the reliability of the quality of health care services in the hospital under study.
Testing the third sub-hypothesis, which states: There is a statistically significant effect of therapeutic nutrition services on the safety of the quality of health care services in the hospital under study
The impact of effective management of therapeutic nutrition services on enhancing the safety dimension of health care quality.

In the context of testing the sub-hypothesis related to the effect of the independent variable (effective management of therapeutic nutrition services) on a specific dimension of the dependent variable (safety of the quality of health care services), a simple linear regression model was used. Table. (7) shows the results of this analysis, confirming the strength of the administrative and statistical impact:

Table (7): Linear regression analysis to find the impact of effective management of therapeutic nutrition services on the safety and quality of health care services

Statement	Correlation Coefficient (R)	Coefficient of Determination (R2)	F-TEST (ANOVA)	Viewer Morale Level (SIG.)
The impact of therapeutic nutrition services on the safety and quality of health care services	o.778	0,605	58,178	0,000

It is clear from the previous table that the value of the correlation coefficient is equal to (0.778) with a positive sign. This indicates that the relationship between (therapeutic nutrition services) and (security for the quality of health care services) is a direct relationship, meaning that the higher the level of (therapeutic nutrition services), the higher the level of (security for the quality of health care services) (and vice versa). Also, the coefficient of determination (R^2) is equal to (0.605) Which means that therapeutic nutrition services are responsible for explaining (60.5%) of the changes that occur in (security for the quality of health care services), and that (39.5%) is due to other factors, in addition to the limit of random error. Since the value of (F) of the viewer is equal to (58.178) with a significance level of (0.000), less than (0.05), this indicates that the model is significant in interpreting the relationship and measuring the impact, which means that it is possible to rely on the regression equation.

This confirms and supports the hypothesis that: There is a statistically significant effect of therapeutic nutrition services on the safety and quality of health care services in the hospital under study.

Testing the fourth sub-hypothesis, which states: There is a statistically significant effect of therapeutic nutrition services on the tangibility of the quality of health care services in the hospital under study

Simple linear regression analysis aims to test the sub-hypothesis related to the effect of therapeutic nutrition services as an independent variable on the tangibility of the quality of health care services as a dependent variable (post-tangibility), which represents a fundamental pillar within performance and quality indicators in health facilities.

Table (8): Linear regression analysis to find the impact of therapeutic nutrition services on the tangibility of the quality of health care services

Statistical Indicator	Valuable	Function and statistical significance	Semantics in the field of health administration
Correlation coefficient (R)	0,553	Measures the strength and direction of a relationship. The value (0.553) indicates a medium-strength direct relationship between the two variables.	It indicates that improving nutrition services leads to increased customer awareness of the "tangibility" of quality (such as the cleanliness of the place, the appearance of workers, and the availability of equipment).
Correlation coefficient (R)	0,306	Measures the strength and direction of a relationship. The value (0.553) indicates a medium-strength direct relationship between the two variables.	It indicates that improving nutrition services leads to increased customer awareness of the "tangibility" of quality (such as the cleanliness of the place, the appearance of workers, and the availability of equipment).
Correlation coefficient (R)	16,780	Measures the strength and direction of a relationship. The value (0.553) indicates a medium-strength direct relationship between the two variables.	It indicates that improving nutrition services leads to increased customer awareness of the "tangibility" of quality (such as the cleanliness of the place, the appearance of workers, and the availability of equipment).
Correlation coefficient (R)	0,000	Measures the strength and direction of a relationship. The value (0.553) indicates a medium-strength direct relationship between the two variables.	It indicates that improving nutrition services leads to increased customer awareness of the "tangibility" of quality (such as the cleanliness of the place, the appearance of workers, and the availability of equipment).

It is clear from the previous table that the value of the correlation coefficient is equal to (0.553) with a positive sign. This indicates that the relationship between (therapeutic nutrition services) and (the tangibility of the quality of health care services) is a direct relationship, meaning that the higher the level of (therapeutic nutrition services), the higher the level of (the tangibility of the quality of health care services) (and vice versa). Also, the coefficient of determination (R^2) is equal to (0.306) Which means that therapeutic nutrition services are responsible for explaining (30.6%) of the changes that occur in (the tangibility of the quality of care services.

This confirms and supports the hypothesis that: There is a statistically significant effect of therapeutic nutrition services on the tangibility of the quality of health care services in the hospital under study.

Testing the fifth sub-hypothesis, which states: There is a statistically significant effect of therapeutic nutrition services on empathy for the quality of health care services in the hospital under study.

The statistical impact of therapeutic nutrition services on empathy for the quality of health care services

This statistical analysis aims to test the fifth sub-hypothesis, which assumes a statistically significant effect of therapeutic nutrition services as an independent variable on empathy as a dimension of the quality of health care services in the hospital under study. To achieve this, simple linear regression analysis (Simple Linear Regression) was relied upon.

Table. (9) shows the results of linear regression analysis to find the impact of therapeutic nutrition services on empathy for the quality of health care services:

Table (9): Linear regression analysis to find the impact of therapeutic nutrition services on empathy for the quality of health care services

Statistical decision	Significance level (Sig.)	Viewing F value	Coefficient of determination (R2)	Correlation coefficient (R)
accepting the hypothesis	O,000	45,477	0,545	0,837

It is clear from the previous table that the value of the correlation coefficient is equal to (0.738) with a positive sign. This indicates that the relationship between (therapeutic nutrition services) and (empathy for the quality of health care services) is a direct relationship, meaning that the higher the level of (therapeutic nutrition services), the higher the level of (empathy for the quality of health care services) (and vice versa). Also, the coefficient of determination (R^2) is equal to (0.545) Which means that therapeutic nutrition services are responsible for Explaining (54.5%) of the changes that occur and (empathy for the quality of health care services), and that (45.5%) is due to other factors, in addition to the limit of random error. Since the value of (F) of the viewer is equal to (45.477) with a significance level of (0.000), less than (0.05), this indicates that the model is significant in interpreting the relationship and measuring the impact, which means that it is possible to rely on the regression equation.

This confirms and supports the hypothesis that: There is a statistically significant effect of therapeutic nutrition services on the empathy of the quality of health care services in the hospital under study. Analysis of the second main statistical hypothesis for evaluating the quality of health care services:

The second main hypothesis of the study was to evaluate the level of quality of health care services provided at Al-Jalaa Children's Hospital/Tripoli. To conduct statistical analysis, this hypothesis was formulated in the form of a zero statistical hypothesis (H_0) that states: "The level of quality of services Health care at Al-Jalaa Children's Hospital/Tripoli is low," compared to the alternative hypothesis (H_1) which states that: "The quality level of health care services at Al-Jalaa Children's Hospital/Tripoli is not low."

Table (10): of the results of the T-test for one sample in detail, as this table represents the quantitative summary on which the analysis in the field of health management was based. The following table shows the most important statistical indicators that were used to test the hypothesis of a low level of quality of health care services:

Table (10): Arithmetic mean ،standard deviation and T-test results

Statistical Indicator	Valuable	Indicative
Arithmetic mean (Mean)	1,92	Represents the average estimates of sample members (beneficiaries/workers) of the level of quality of services provided. Since this number (1.92) falls within the range that represents the "average score" on the approved study scale, it indicates that the overall assessment of service quality is not very low, but needs improvement.
Standard Deviation (Standard Deviation)	0,652	Measures the dispersion and diversity of sample members' opinions about the level of quality. The value (0.652) indicates that there is reasonable variation in viewpoints; that is, the opinions of individuals are not completely identical, which means that some of them may see the quality as higher or lower than the overall average.(1.92)
Test statistic value T	2,401	It is the calculated value of the T test that measures the statistical dimension of the obtained arithmetic mean (1.92) from the assumed mean for comparison (the mean adopted in the study to determine the decrease). The higher the T value (either positive or negative), the greater the indication that there is a real difference between the sample mean and the assumed mean.
Statistical significance (P-Value)	0,021	This is the most important value in analysis. It represents the probability of obtaining this result by chance if the null hypothesis (H_0) is correct.

We note from the data of Table (10) that the weighted arithmetic mean is equal to (1.92) and a corresponding standard deviation (0.652) and that the value of its test statistic T is (2.401) with a statistical significance of (0.021) and since this value is less than the approved morale level (0.05) and the value of the weighted arithmetic mean is greater than the average approved in the study, This confirms and supports the incorrectness of hypothesis H_0, which states that "the level of quality of services The health care provided at Al-Jalaa Children's Hospital is low, and the alternative hypothesis Hı is accepted, which states that the quality of health care services at Al-Jalaa Hospital / Tripoli was average according to the scale adopted in the study.

This interpretation confirms that hospital management needs continuous improvement plans to raise quality from medium to high grade, especially in the context of child care.

Discussion:

The results of this study demonstrate that effective management of therapeutic nutrition services is one of the fundamental pillars of enhancing the quality of healthcare at Al-Galaa Children's Hospital. However, the level of this management from the perspective of healthcare providers was moderate, reflecting a complex reality that combines positive professional practices on the one hand, and persistent organizational and logistical challenges on the other. Regarding the characteristics of the medical staff, the results showed a clear majority of bachelor's degree holders, with a limited percentage of those with postgraduate studies, in addition to the superiority of the specialty of human medicine compared to the low representation of therapeutic nutritionists. This result can be explained in light of the theoretical framework of health human resources management, which confirms that an imbalance in the professional structure leads to a weakening of the effectiveness of supporting services, including: Therapeutic nutrition. The literature indicates that the numerical shortage of nutritionists within government hospitals is a common phenomenon, and negatively affects the quality of nutritional care provided to patients, especially in pediatric departments that require precise and continuous nutritional interventions (Laur et al., 2015; Tappenden et al., 2013) . Other studies have also shown that the presence of specialized and integrated nutrition teams directly contributes to improving health outcomes and reducing clinical complications (Reber et al., 2019) .

Regarding the effectiveness of managing therapeutic nutrition services, the results showed that the highest levels of approval were represented by the dimension of professional integration between the doctor and the nutritionist in treatment planning for the sick child. This finding is consistent with the multidisciplinary healthcare model, which asserts that collaboration between different healthcare professions enhances the quality of treatment decisions and reduces fragmentation in service delivery. Recent studies have confirmed that cooperation between Physicians and nutritionists are a critical factor

in improving malnutrition management and reducing hospital length of stay, especially in children (Alzahrani et al., 2024; Fewster-Thuente & Velsor-Friedrich, 2008). This dimension reflects a professional awareness of the importance of therapeutic nutrition, even in light of limited specialized human resources.

In contrast, the efficiency of managing logistical and financial resources came last, indicating structural challenges related to kitchen equipment, cost management, and the quality of meals provided. This finding can be explained in light of health resource management theory, which believes that weak financing and the absence of strategic planning for the food supply chain lead to a decline in the quality of food outputs. This result is consistent with what I have found He presented a study by Casas and colleagues, which showed that government hospitals suffer from a shortage of basic inputs needed to provide high-quality medical meals, as a result of financial and administrative constraints (Casas et al., 2023).

Rasmussen and colleagues also noted that the implementation of nutritional therapy in hospitals often faces regulatory barriers that make its implementation less efficient despite its clinical importance (Rasmussen et al., 2006)

The overall arithmetic mean for effective management of therapeutic nutrition services, which was moderate, reflects an acceptable level of organization and coordination, but it does not rise to the level required to achieve high and sustainable quality. This finding is consistent with several studies that have confirmed that hospital nutrition services often operate at an "acceptable minimum" level, without being fully integrated into the overall quality strategy(Abosalah[1] et al., 2024; Schiller et al., 1994; Splett et al., 2001). Add a reference to the Zliten Medical Center paper.

Regarding the quality of healthcare services, the results showed that the overall level of quality was average, which is consistent with the SERVQUAL model, which assumes a persistent gap between expected and perceived quality, especially in government healthcare institutions. The security dimension topped the ranking, indicating an acceptable professional and ethical commitment regarding the confidentiality of information and the integrity of procedures, which is consistent with Studies conducted in children's hospitals in similar contexts, where basic ethical standards are often maintained despite limited capabilities.

In contrast, tangibility was lowest, reflecting the poor infrastructure and therapeutic environment, particularly the lack of supportive facilities for children such as entertainment halls. The literature confirms that the physical environment represents an essential element in the quality of children's health care, because of its direct impact on psychological comfort and general satisfaction, as well as on the child's acceptance of treatment and nutritional plan (Farveen et al., 2022; Homer et al., 2005; Mahmood et al., 2017).

The results of the statistical analysis showed a strong and statistically significant direct relationship between the effective management of therapeutic nutrition services and all dimensions of health care quality, including responsiveness, reliability, security, tangibility, and empathy. These results are consistent with the theory of total quality in health care, which confirms that supportive services, especially therapeutic nutrition, constitute a pivotal element in improving the overall performance of the institution. Studies have shown that improving nutrition services contributes to raising the level of response to patients' needs, enhancing reliability in service provision, reducing clinical errors, in addition to supporting the human aspects of care such as empathy and individual attention. (32,33,34).

In light of the administrative and health context of Al Galaa Children's Hospital, these results can be explained by considering the hospital as a government facility operating in an environment characterized by demand pressure, limited resources, and accumulated organizational challenges(Ishkartu et al., 2025). However, the results showed professional strengths, especially with record to integration clinically and commitment to safety, are points that can be built upon within continuous quality improvement programs. However, continued shortcomings in logistical and tangible aspects may limit the full impact of therapeutic nutrition services, keeping the quality level within the average framework.

Based on the above, the results of this study confirm, in light of the scientific literature, that effective management of therapeutic nutrition services is not merely a support function, but rather represents a strategic element in enhancing the quality of comprehensive healthcare, especially in children's hospitals that require high and integrated quality standards.

Conclusion:

The study results concluded that the level of management of therapeutic nutrition services at Al-Galaa Children's Hospital was moderate, reflecting existing but incomplete organizational efforts that require more in-depth methodological development. The results also showed that the quality of health services provided was lower than expected, confirming the existence of a quality gap that requires urgent administrative interventions. The effectiveness of therapeutic nutrition services management has

been shown to significantly impact all dimensions of health quality according to the SERVQUAL model, including responsiveness, reliability, security, tangibility, and empathy This highlights the pivotal role of these services in improving overall health performance. While some strengths emerged, such as cooperation between doctors and nutritionists in developing nutritional plans and following up on their implementation, clear weaknesses emerged in the infrastructure and physical and logistical equipment, especially in the tangibility dimension, which recorded the lowest levels of quality. The results also confirmed that developing human resources and increasing the number and training of specialists represents an essential factor in raising the efficiency of services and achieving the satisfaction of patients and their families. Accordingly, the study confirms that enhancing the effective management of therapeutic nutrition services, along with investing in human resources and digital technologies, is an essential approach to addressing existing gaps and achieving excellence in health performance in the hospital under study.

Recommendations:

The study recommends modernizing hospital infrastructure, maintaining facilities, and equipping medical and therapeutic nutrition departments with modern equipment to enhance the tangible dimension. Therapeutic nutrition services should be integrated into each patient's basic treatment plan, and standardized protocols should be adopted to ensure reliable quality. It also stresses the importance of developing human cadres through continuous training programs for new doctors and nutritionists and enhancing communication skills and emotional intelligence to raise the level of empathy in dealing with patients and their families. On the security and privacy side, she recommends continuing to implement strict policies to protect patient data and clarifying safety procedures to enhance trust. In terms of reliability and responsiveness, waiting times need to be reduced through an electronic reservation system, more efficient administrative organization, and an increase in the number of doctors and nutritionists during peak times to ensure rapid response. Finally, the study calls for adopting total quality management in accordance with international standards, while using key performance indicators to periodically measure development in the five dimensions of quality.

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