

# Relational marketing and perceived quality of healthcare service by the staff of the Radiotherapy Area of INEN, 2023–2024

## Marketing relacional y calidad del servicio asistencial percibida por el personal del Área de Radioterapia del INEN, 2023-2024

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### ABSTRACT

**Objective.** The objective of the study was to determine the relationship between relational *marketing* and the perceived quality of healthcare service by the staff of the Radiotherapy Area of the National Institute of Neoplastic Diseases (INEN), 2023–2024. **Methods.** A non-experimental design methodology of a quantitative approach was applied; likewise, the survey was used as the technique and the questionnaire as the data collection instrument, applied to a probabilistic sample of fifty radiation oncologist physicians, medical physicists, and medical technologists of INEN. The data were analyzed in SPSS version 29, under a nonparametric analysis (Spearman's Rho) for inferential analysis. **Results.** The results showed a positive and statistically significant relationship between relational *marketing* and the healthcare services perceived by the staff of the Radiotherapy Area of INEN ( $\rho = 0.420$ ;  $p < 0.01$ ). Positive evaluations were found regarding communication and service safety; however, the technical supports found in the service presented less consistent perceptions, which became a critical point to be improved. **Conclusions.** Relational marketing is considerably linked to the perceived quality of healthcare service by the staff of the Radiotherapy Area of INEN, showing intermediate-high mediation levels. However, the result suggests the need to specify the strengthening of operational and relational aspects to avoid stagnation and consolidate service improvement in a sustained manner within a highly specialized healthcare context.

**Keywords:** relational marketing; quality of healthcare service; healthcare personnel; radiotherapy; healthcare services management.

### RESUMEN

**Objetivo.** El objetivo del estudio fue determinar la relación entre el *marketing* relacional y la calidad del servicio asistencial percibida por el personal del Área de Radioterapia del Instituto Nacional de Enfermedades Neoplásicas (INEN), 2023–2024. **Métodos.** Se aplicó una metodología de diseño no experimental de enfoque cuantitativo; asimismo, se empleó la encuesta como técnica y el cuestionario como instrumento de recolección de datos aplicado a una muestra probabilística de cincuenta médicos radioncólogos, físicos médicos y tecnólogos médicos del INEN. Los datos se analizaron en SPSS versión 29, bajo un análisis no paramétrico (Rho de Spearman) para el análisis inferencial. **Resultados.** Los resultados mostraron una relación positiva y estadísticamente significativa entre el *marketing* relacional y los servicios asistenciales que percibe el personal del Área de Radioterapia del INEN ( $\rho = 0,420$ ;  $p < 0,01$ ). Se encontraron evaluaciones positivas respecto a la comunicación y la seguridad del servicio; sin embargo, los soportes técnicos que se encuentran en el servicio presentaron percepciones menos consistentes, lo que se convirtió en un punto crítico a mejorar. **Conclusiones.** El *marketing* relacional se vincula de manera considerable con la calidad del servicio asistencial percibida por el personal del Área de Radioterapia del INEN, mostrando niveles de mediación intermedia-alta. Sin embargo, el resultado sugiere la necesidad de concretar el fortalecimiento de los aspectos de orden operativo y relacional para evitar estancamientos y consolidar una mejora del servicio de manera sostenida en un contexto asistencial de alta especialización.

**Palabras clave:** marketing relacional; calidad del servicio asistencial; personal de salud; radioterapia; gestión de servicios de salud.

### Cite as

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## INTRODUCTION

The National Institute of Neoplastic Diseases (INEN, 2014)

shows that the incidence and mortality rate in Metropolitan Lima for all cancers in men and women increased in the period 2004–2005 by 1.14% in men and 1.12% in women, with cervix, breast, and prostate also being the main ones (p. 22).

One of the therapeutic tools most used in the fight against cancer is radiotherapy, a clinical discipline available in Peru that uses ionizing radiation to destroy malignant cells (Sarria et al., 2025). These radiations are generated by high-technology equipment called linear accelerators, which allow precise doses of radiation to be administered to specific tumor areas, preserving as much as possible the surrounding healthy tissues (RT Answers, n.d.).

Cancer treatment in oncology requires a procedure that may range from one session to more than thirty-five or more, depending on different parameters, such as the type of cancer, size, location, and the clinical status of the patient in question. Continuity and timeliness are recognized as essential clinical principles when providing care. However, the effectiveness of treatment may be put at risk if it is not taken into account that every moment is vital for the patient's prognosis (Schoonbeek et al., 2021). From the relational *marketing* approach, the clinical factor is linked to service quality. This is because integration, trust, and communication between the healthcare staff and technical support providers allow operational gaps to be reduced, ensure service availability, and, indirectly, strengthen care processes that significantly impact the care of oncology patients.

According to Paz Campuzano (2022), INEN, as the leading institute at the national level against cancer, has five linear accelerators (the center with the greatest equipment in the country) and treats more than five hundred patients daily, working twenty-four hours a day, seven days a week, three hundred sixty-five days a year; therefore, when one of these devices fails and becomes inoperative, it causes a delay in access to timely treatment, which is crucial for curing cancer.

From a widely recognized view, Parasuraman et al. (1985) indicate that service quality is evaluated through the comparison between customer expectations and their perception of the service received. In other words, if what the customer receives matches or exceeds what was expected, then the service is considered to be of quality, which, when added to a health setting, should go beyond the exceptional. Therefore, attention and care offered to customers must be maximized, especially in

the delivery of value of health services that will impact the development of a human disease, which must be constantly measured to evaluate its performance (Alshrbaji et al., 2022).

On the other hand, service providers in the health sector must be clear that quality and, even more, excellence are the result of the work of all components of the holistic *marketing* process of an organization; moreover, adapting the four variables of modern *marketing* (people, processes, programs, and performance) ensures the satisfactory delivery of the offered product or received service (Kotler & Keller, 2016).

Measuring service quality through *marketing* research is an instrument that allows observing expectations and the appreciation of service quality for consumers in order to foster loyalty and obtain future repurchases (Grönroos, 2015). Under this perspective, the impact on patients was analyzed from an approach that goes beyond the medical act, recognizing the importance of human relationships, quality perception, and efficient service management from the way providers act. The case of INEN is presented as a key reference to understand how the implementation of customer-centered strategies can significantly impact service perception and, consequently, patient recovery and adherence to treatment (Grönroos, 2015; INEN, 2022). In addition, Luo & Bhattacharya (2006) conceptualize that service quality is demonstrated as the capacity of an organization to meet customer expectations through the consistent delivery of efficient, reliable, and personalized services.

For the foregoing reasons, the objective of the study was to determine the relationship between relational *marketing* and the quality of healthcare service perceived by the staff of the Radiotherapy Area of INEN, 2023–2024—oncological radiotherapy understood as one of the most important, accessible, and effective therapeutic strategies in the comprehensive treatment of cancer.

## Theoretical approach

Kotler and Keller (2016) indicate that service quality does not only depend on the final outcome, but also on the process through which the service is delivered, and involves factors such as attention, staff empathy, punctuality, and the capacity to respond to specific needs, which means that an excellent service is not limited to fulfilling a task, but is also manifested in how that experience is carried out.

For his part, Grönroos (2007) proposes an integrative view by considering both the technical dimension (what is offered) and the functional dimension (how it is offered), emphasizing that both are fundamental for customer perception. In sensitive contexts such as the health sector, these dimensions acquire even greater

relevance, since patients not only expect clinical results, but also humane and reliable treatment.

From a more updated view, Kotler et al. (2021) highlight that customer experience has become the new competitive battleground. In an environment where technology and data allow services to be personalized more precisely, organizations have to design integrated, seamless, and meaningful experiences at all customer touchpoints. This means that service quality no longer only implies efficiency or compliance, but the capacity to generate positive emotions, trust, and value in each interaction.

Value delivery is the fundamental objective of *marketing*, by establishing core competencies where the customer will receive benefits that will be perceived, unique, and far-reaching, and as stated: "Customer value is the difference between the evaluation that the customer makes of all the benefits and all the costs of a market offering and the perceived offerings of competitors" (Kotler & Keller, 2012, p. 134). Therefore, it is of vital importance to measure their satisfaction regarding the perceived value of products and service quality, since loyalty and, in turn, a possible repurchase from providers will depend on this.

According to Parasuraman et al. (1985), service *marketing* excellence encompasses external *marketing*, internal *marketing*, and interactive *marketing*, where employees must have the capacity to provide optimal and satisfactory service to users, and where strategy, commitment, and high standards differentiate the services of one provider from another; in addition, innovation and the identification of customer needs are part of an after-sales service strategy (Lovell and Wirtz, 2015).

Likewise, from the clinical point of view, cancer is a disease characterized by a profound alteration in the normal functioning of the body's cells, specifically in their genetic material, DNA. This alteration causes cells to multiply in an accelerated, uncontrolled, and disorganized manner, escaping the body's cellular regulation mechanisms (National Cancer Institute, 2021). Unlike other localized diseases, cancer has the capacity to invade adjacent tissues and spread to other parts of the body through the bloodstream or the lymphatic system, a process known as metastasis, which significantly increases its lethality if it is not diagnosed and treated in a timely manner (Biray et al., 2024).

According to radiobiology, treatment time constitutes a determining factor in therapy effectiveness. Evidence shows that tumor cell repopulation is influenced by continuity and consistency in the daily administration of doses. When treatment is interrupted or extended beyond the optimal interval, the so-called isoeffect is compromised, that is, the effective capacity of radiation to eradicate cancer cells. Therefore, therapeutic timeliness

is fundamental to maximize the probabilities of success and patient cure (Chow et al., 2023).

Therefore, it is of vital importance to analyze the quality of healthcare service perceived by the staff of the Radiotherapy Area of INEN and its variables, which could be related to the progression of the disease of hundreds of patients treated daily and to the equipment operating full time, and which will be analyzed in this article by observing the direct impact shown by the relationship between the client (INEN) and the service providers, sale, installation, and maintenance of oncological radiotherapy equipment on the lives of cancer patients in our country.

## METHODS

The research design is the general strategy and logic of the project that involves choosing methods, procedures, and techniques to collect data in order to answer the following research question: how do planners' choices influence quality of life? (Creswell & Creswell, 2023).

### Type and area of study

The research is developed under a non-experimental design, a quantitative approach, and a correlational level, since its purpose is to determine the statistical relationship between relational *marketing* and the quality of healthcare service perceived by the staff of the Radiotherapy Area of INEN, without deliberate manipulation of the variables.

Likewise, the present study is of an applied type, insofar as it focuses on the study of clearly defined and measurable variables, with the objective of generating concrete and useful empirical evidence for decision-making in real contexts.

### Population and sample

The total population consisted of fifty-six appointed and CAS professionals, including area heads, radiation oncologists, medical physicists, and medical technologists from the Radiotherapy Area, who were involved in the use and management of linear accelerator equipment during the years 2023–2024, and who correspond to the minimum professionals suggested for care in this discipline (RadiologyInfo, 2023). From this population, fifty professionals were selected through a probabilistic simple random sampling, within a confidence level of 96%, with a margin of error of 5%, applying the statistical formula for a finite population as follows:

$$n = \frac{N \cdot Z^2 \cdot p \cdot q}{e^2 (N - 1) + Z^2 \cdot p \cdot q}$$

**Where:**

$n$  = Sample size (50 professionals)

$N$  = Population size (56 professionals)

$Z$  =  $Z$  value according to the confidence level ( $96\% = 2.05$ )

$p$  = Probability of success =  $50\%$  ( $0.50$ )

$q$  = Probability of failure =  $50\%$  ( $0.50$ )

$e$  = Maximum permitted error ( $5\%$ )

As exclusion criteria, professionals hired as third parties were not considered, since they usually have little relationship with the department or are relatively new to the service; additionally, opinions regarding suppliers of cobalt therapy, brachytherapy, and simulation tomography equipment were not taken into account.

### Variables and data collection instruments

The relational *marketing* variable builds and maintains long-term relationships with customers based on trust, excellent communication, and shared value to foster loyalty, repeat purchase, and the development of relationships beneficial to both parties (Kotler & Keller, 2021). This variable was studied through the following dimensions: customer loyalty, perceived value, satisfaction, quality of products and services, empathy, and tangible elements, through twelve questions.

The healthcare service quality variable, according to Fernández-Calderón (2025), is the degree to which health services, organized under criteria of safety, effectiveness, continuity, and humanization, respond to the needs, expectations, and rights of users and the healthcare team, through an adequate combination of technical competence, effective communication, dignified treatment, and efficient management of available resources. On the other hand, Benítez-Ortega et al. (2021) propose that the quality of healthcare service perceived by health personnel refers to the subjective judgment made by professionals and healthcare workers regarding the degree to which the processes, resources, organizational conditions, and outcomes of the care they provide meet standards of safety, effectiveness, accessibility, continuity, and humanization, and respond adequately to patient needs —less commonly— and to the demands of professional practice.

Both variables were measured based on the 10-point Net Promoter Score (NPS) scale, which allows measuring customer loyalty in a simple and direct manner; predicts future behaviors and financial results; facilitates the segmentation of promoters, passives, and detractors; is a valid tool to evaluate service quality; and fosters a customer-centered culture (Jaramillo et al., 2023).

In addition, reliability was measured through Cronbach's alpha (Edelsbrunner et al., 2025), obtaining very high magnitude results of 0.935 (relational *marketing*) and 0.951 (healthcare service quality), respectively.

### Techniques and procedures for data collection

For this study, the survey technique was used with responses on a 10-point Net Promoter Score (NPS) scale. For the validation of the instrument, expert judgment was used, with the participation of three specialists in Administration and Marketing from the Universidad Nacional Mayor de San Marcos. A global Aiken's  $V$  coefficient higher than the minimum acceptable value ( $V \geq 0.80$ ) was obtained, which demonstrates adequate content validity. The surveys were conducted with prior authorization from June to September 2023 on a single occasion, without follow-up, and were anonymous, to measure customer loyalty and the impact on patients toward their sole provider of linear accelerator services.

### Data analysis

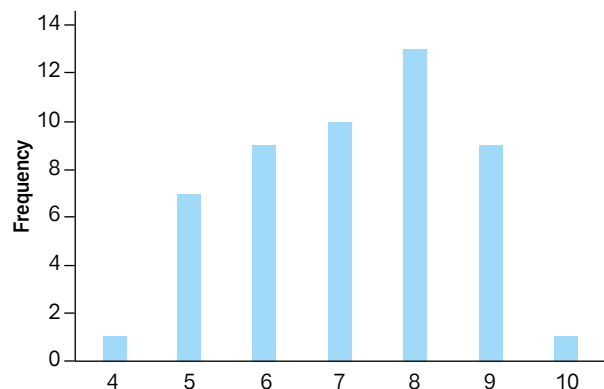
The tabulated and analyzed data were entered into the statistical program IBM SPSS Statistics, through which tables and figures were obtained for descriptive presentation; additionally, Spearman's rho test and normality tests were used to measure the strength and direction associated between the two variables.

### Ethical aspects

This research, throughout its process, did not include experiments on human beings or animals, and the research ethics codes of the Universidad Nacional Mayor de San Marcos were applied, with its main aspects being integrity, respect for participants, responsibility, prevention of plagiarism, ethical evaluation, and dissemination and training. In addition, during the surveys, participants were informed about consent for the use of their responses for the preparation of this study.

## RESULTS

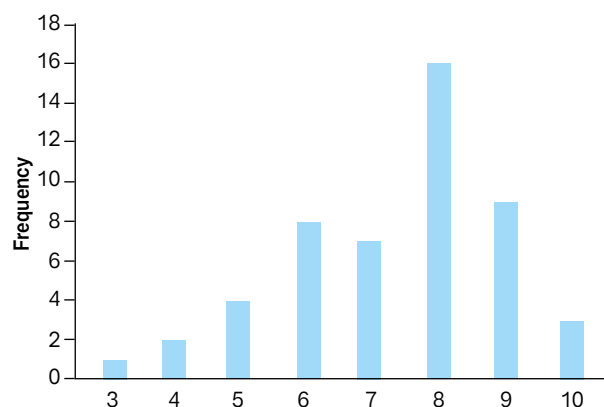
The statistics of the processing of the sample of fifty surveys in the SPSS *software* version 29 identified an overall mean of 7.16 out of 10 in the level of recommendation of the service provider. This value was reduced to a moderately favorable overall perception. However, when performing the NPS categorization, it was observed that only 20% of the respondents could be described as promoters, while 34% represented the behavior of detractors. In addition, a significant frequency of responses collected at seven points was identified, which makes the general position neutral toward the service analyzed (see Table 1 and Figure 1).

**Figure 1**
*Recommendation of radiotherapy service provider*


1. From 1 to 10, how likely are you to recommend your distributor?

Regarding the perception of the security of the service provided, which is a critical aspect in its association with personnel in clinical contexts such as oncological radiotherapy, the results show that the participating staff perceive this dimension in a moderately favorable manner. This includes the level of confidence in the provision of the service and the feeling of security that it is a support service with preventive and corrective maintenance, which is essential not only to give continuity to the approach, but also to ensure that specialized care services have financing and effective service.

The statistical analysis yielded a mean of 7.34, which indicates that, in general, the participants had a positive perception of service security. Also, the median and the mode, both equal to 8.00, indicate that more than half of the surveyed participants gave high scores, which suggests an extended appreciation of trust, in terms of security, in the technical service in charge of clinical processes in the field of radiotherapy.

**Figure 2**
*Feeling of security with the service received*


2. From 1 to 10, do you feel confident about the service you received?

**Table 1**
*How much do you recommend your distributor?*

Scores	n=50	
	fi	%
4	1	2
5	7	14
6	9	18
7	10	20
8	13	26
9	9	18
10	1	2

Likewise, the fact of obtaining a standard deviation of 1.636 confirms that the responses present moderate variability and that the ratings do not differ with certainty with respect to the general average. For its part, the kurtosis coefficient resulted in -0.069, with a standard error of 0.662. In this case, it is possible to assume that it is an approximately mesokurtic distribution, that is, it does not present extreme concentrations of ratings that distort the interpretation.

The results show that the staff consider that the service is safe and reliable within an acceptable range, given that high values are recorded in the central measurements. However, the recognition of certain lower ratings serves as evidence that it is necessary to further reinforce certain processes in order to consolidate the homogeneous distribution of perceived security, which is established as an indicator of great relevance for the management of care quality (see Table 2 and Figure 2).

Among the elements of the healthcare service that are evaluated in relation to its quality is the punctuality of the technical staff dependent on the support of radiotherapy equipment. This is because their on-time presence is a fundamental factor for the safety of the continuous operability of the equipment. At the same time, it is closely linked to the continuity of oncological treatments; therefore, operational delays may violate therapeutic scheduling and affect the clinical effectiveness of the procedures.

**Table 2**
*Do you feel secure with the service received?*

Population	50
Mean	7.34
Median	8.00
Mode	8.00
Standard deviation	1.636
Kurtosis	-0.069
Standard error of kurtosis	0.662



For this dimension, the score obtained was an average of 6.92, that is, lower than expected, since radiotherapy is a critical service in most cases. The median was 7.00, which means that at least half of the staff consider punctuality to be acceptable, although not excellent. This rating indicates that punctuality is a functional component, but with great potential for improvement.

With a standard deviation of 2.049 and a variance of 4.198, the dispersion of the responses is significant, which implies that perceptions are heterogeneous among respondents. While a substantial group expressed that they had positive experiences in terms of how fast the technical support was, another sector mentioned that repeated delays occurred. Therefore, it appears that the service was provided unevenly.

On the other hand, kurtosis yielded a value of -0.667, with a standard error of 0.662, which demonstrates a platykurtic distribution. This numerical approximation certifies a wide spread of responses around the mean, without a marked concentration of these at extreme values, a fact that consolidates the thesis regarding the nonexistence of a single perception of the punctuality of the technical service.

In general terms, these findings show that the punctuality of the technical staff constitutes a sensitive aspect for the management of the healthcare service not only due to its impact on operational efficiency, but also due to the contingency of cancer treatment. Therefore, this perception should be interpreted as a warning signal for operational management, as it indicates the need to strengthen technical availability protocols, optimize logistical coordination, and guarantee timely responses that result in the improvement of the service and the well-being of the patients treated (see Table 3).

**Table 3**  
*Do you feel that the engineers are punctual?*

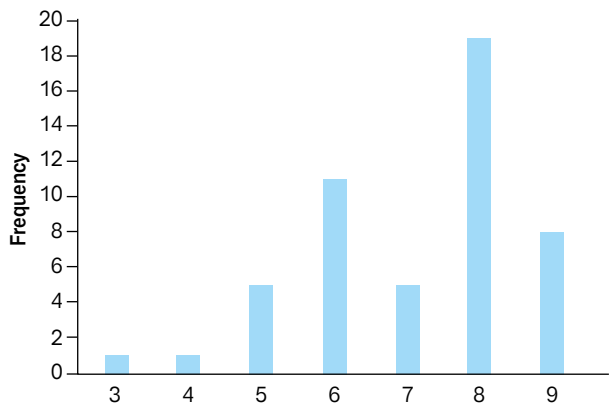
Population	50
Mean	6.92
Median	7.00
Mode	9.00
Standard deviation	2.049
Kurtosis	-0.662
Standard error of kurtosis	0.662

The quality of communication between the provider and the INEN staff is one of the most sensitive and strategic aspects in the provision of the service. Given the nature of a highly complex hospital environment, where technical precision and timeliness are crucial elements, effective communication becomes one of the critical success factors to guarantee the operational continuity of radiotherapy equipment and the correct scheduling of

oncological treatments. The calculation of staff opinion related to the perception of communication between the Radiotherapy Department and the provider company produced a mean of 7.14, which is a normal evaluation. In addition, the value of the median and the mode, which is 8.00 for both, suggests that most respondents rated their perception at higher levels. The standard deviation of 1.471 indicates moderate variability in the responses, while the kurtosis value of -0.135, considering the standard error of 0.662, is approximately equal to zero, which suggests a uniform distribution.

The results obtained, reflected in an overall positive perception of communication, associate it as a relevant aspect in the service management modality, although there are still experiences that relate delayed responses, the absence of *follow-up*, and the limited clarity offered. In relation to INEN, the lack of this communication does not evidence a secondary aspect, but rather the necessary opportunity for a radiotherapy service of the magnitude and magnification of INEN to anticipate incidents, plan maintenance, and reduce equipment downtime. In its absence, deficiencies may condition the service as a function of the variability and continuity of communication, also causing administrative and clinical impacts that justify establishing strengthened channels with clear guidelines and response times and real conditions to improve the quality of care (see Figure 3).

**Figure 3**  
*Department-company communication*



**4. How do you feel about the communication between the department and the company?**

The results of the Spearman correlation analysis show the existence of a positive and statistically significant relationship between relational *marketing* and the quality of care service perceived by the staff of the Radiotherapy Area ( $\rho = 0.420$ ;  $p = 0.002$ ). The moderate magnitude of the coefficient indicates that higher levels of practices associated with relational *marketing* are linked to a better perception of service quality. Likewise, the significance value obtained, lower than 0.01, confirms that the observed association is not the product of chance, and allows acceptance of the research hypothesis proposed for the analyzed context.

## DISCUSSION

The results confirmed the existence of a positive and statistically significant relationship between relational *marketing* and the quality of the service received by the staff of the Radiotherapy Unit of INEN. This result is consistent with what was proposed by Grönroos (2007, 2015), who points out that service quality is not limited to what can be produced from a technical outcome, but is formed from the relationship between the provider and the client, considering functions such as communication, trust, and the strengthening of the relationship and the service. In a highly specialized environment such as a hospital, the value of such dimensions is determinant, as it impacts the way the service is perceived and the continuity of its operation.

From the perspective of Kotler and Keller (2016, 2021), relational *marketing* makes it possible to generate and consolidate long-term relationships through the creation of value, which is evidenced in the study insofar as more robust relationships are observed to be associated with better evaluations of the quality of care provided. This finding has also been pointed out by Kotler et al. (2021), who establish that the customer experience—in this case, the institutional client, which is the health personnel—becomes a key factor of differentiation and sustainability, even in the case of public and highly complex services.

The positive value in service safety aligns with the quality model, highlighting the issue of reliability, proposed by Parasuraman et al. (1985) as one of the most relevant attributes in the differentiation of service quality. In the areas of oncology and radiotherapy, trust in the corrective and preventive intervention of the equipment translates into ensuring that treatment can continue. For this reason, this positive result is understood and is also related to recent studies in the health field in which perceived safety is associated with a higher valuation of the care service as a whole.

Likewise, technical support must always be punctual. As mentioned by Schoonbeek et al. (2021) and Chow et al. (2023), delays in treatments are problematic from a clinical and operational integration perspective, because they are relevant from the perspective of the tumor cell repopulation cycle and render treatments clinically ineffective. From this perspective, the delays reported by clinical staff are not simply an operational weakness, but rather a phenomenon of clinical and ethical interest that establishes a change in the management of time as a resource.

Finally, the difficulty and the degree of the procedure highlight the importance of having unique and clear material that improves patient care and the practical-level management of service resources, as well as the importance of coordination, which was achieved in a collaborative manner. In conclusion, the postulates

of relational and services *marketing* are more than applicable to oncological radiotherapy. Today more than ever, relational and operational pillars must be strengthened to reinforce the quality of care in practice.

## Limitations

The research has limitations inherent to its cross-sectional design, given that it collects perceptions at a single moment, making it impossible to determine changes over time. Likewise, the sample size is restricted to a single specialized service, which limits the ability to generate results that can be extrapolated.

## CONCLUSIONS

The study made it possible to determine that there is a positive and statistically significant relationship between relational *marketing* and the quality of health services provided by the staff in the Radiotherapy Department of INEN in the years 2023–2024. This finding confirms that relational *marketing* practices affect the way employees perceive safety, communication, and the level of efficiency of the technical service that supports clinical processes. In addition, although the average perception of care is at a medium–high level, shortcomings are still demonstrated in key operational aspects, especially in the punctuality of the delivery of technical support, which may affect the continuity of oncological treatment. Thus, the findings highlight the importance of comprehensively improving the relational and operational components of the service to ensure a stable improvement in the quality of care in a highly complex hospital environment.

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