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Personnel management model for reducing patient waiting time through sequential notification and staff motivation in a private polyclinic in Chincha

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Abstract*– This research addresses the challenge of reducing patient waiting times at a private polyclinic in Chincha, Peru, with the aim of improving both operational efficiency and the quality of healthcare services. Utilizing the DMAIC methodology, the study implemented a strategic approach centered on two key pillars: fostering intrinsic staff motivation and introducing an appointment management system with sequential notifications. Over a nine-month period, the intervention led to a 54% reduction in schedule non-compliance and a 42% increase in medical consultations via pre-scheduled appointments, resulting in a significant decrease in waiting times from 125 to 49 minutes. These outcomes underscore the effectiveness of combining motivation strategies with digital tools to streamline healthcare delivery. Additionally, the initiative fostered improved communication and coordination among healthcare professionals, enhancing team collaboration, patient satisfaction, and loyalty. The findings demonstrate that the DMAIC methodology, when complemented by efficient appointment systems, offers a valuable framework for optimizing processes and can be replicated in similar healthcare settings to address common service delivery challenges.

***Keywords--* Waiting time, satisfaction, optimization, Appointment management, DMAIC**

I. Introduction

The current situation confronts us with one of the most pressing challenges in the health sector: patient waiting times, whose complexity arises from a series of interrelated factors [1]. Among these factors are the uncertainty of the number of patients to be seen per shift, which may be influenced by various reasons such as the seasonality of certain diseases or adverse weather conditions affecting mobility; the manual management of medical records, which can cause delays and errors in the registration and access to patient information; and the punctuality of medical staff, which may be impacted by various reasons such as workload or unforeseen medical emergencies [1]. As a result of this complex interaction of factors, waiting in hospitals and clinics has become a common and, in many cases, discouraging experience for patients, who may experience anxiety, frustration, and even worsening of their health condition due to the delay in care [2].

It is important to highlight that these prolonged waiting periods not only impact patient satisfaction but also raise critical issues regarding the efficiency and accessibility of healthcare services. Excessive waiting can lead to the postponement of necessary treatments, which in turn can result in the worsening of patients' health conditions and, in extreme cases, even endanger their lives. This situation is exacerbated in contexts where healthcare is limited or inaccessible, further exacerbating health inequities.

In this context, the World Health Organization establishes criteria for quality healthcare coverage, which must be timely, efficient, people-centered, integrated, effective, and equitable [2]. However, the reality shows that these standards are not being adequately met, given that annually between 5.7 to 8.4 million deaths are attributed to poor healthcare in facilities in middle- and low-income countries [2]. This situation underscores the urgent need to comprehensively address waiting times in health systems worldwide.

In the specific case of Peru, health centers, both public and private, report patient waiting times of 114 and 35 minutes [1], respectively. While these figures reflect a significant difference between the public and private sectors, they demonstrate that the issue of waiting times is present in both contexts and requires immediate attention. Furthermore, it is important to consider that these waiting times can vary significantly depending on the medical specialty, time of day, day of the week, and other contextual factors, adding an additional layer of complexity to healthcare management.

It is worth mentioning that while this issue has been the subject of research in developed countries, a direct relationship has not been established between the importance of keeping staff motivated and achieving efficient improvements in information systems to meet stated goals. Hence, there is a need to seek solutions that help mitigate this issue. The motivation for this research focuses on reducing waiting times through an accessible model for a private polyclinic in Chincha, utilizing tools such as digitization and notifications, in line with the principles of the DMAIC methodology. This integrated approach seeks not only to optimize the polyclinic's internal processes but also to improve the patient experience and ensure quality and timely healthcare for the entire community.

II. State of the Art

A. Improvement of Efficiency and Quality of Care

Various studies aim to address healthcare challenges such as efficiency, waiting times, and quality of care. Among the reviewed literature, methodologies based on data analysis, Lean Six Sigma, simulation, and machine learning stand out. The results include improvements in efficiency, cost reduction, and increased patient satisfaction.

Studies focused on data analysis and decision-making have been highlighted for identifying bottlenecks and proposing solutions [3], [4]. In the area of appointment management, models such as STAT and responsive scheduling [5], as well as approaches centered on cost minimization and patient satisfaction, have been observed [6]. Identifying barriers and issues in patient flow has also been significant, with cases such as an 85% increase in patient flow efficiency in hospitals [7] and the application of Lean Thinking to reduce hospital stays [8].

Regarding process optimization, the Lean Six Sigma methodology has proven effective in improving efficiency and quality, with examples like a 54% reduction in waiting times and a significant improvement in patient satisfaction [9]. Multi-objective machine learning has also been successful in reducing waiting times and maximizing customer satisfaction [10]. Simulation has been applied to enhance the efficiency of registration and medical evaluations in pediatric emergency departments [11] and to optimize appointment scheduling without requiring additional resources [12]. Lastly, the design of a provider appointment scheduling system based on the Theory of Constraints Thinking Processes stands out [13].

Research incorporating the DMAIC approach of Lean Six Sigma is presented as one of the best options to address deficiencies and low quality in care. At the polyclinic, this methodology could be implemented to improve appointment management and electronic billing, considering the specific characteristics and needs of the facility, with the support and participation of all staff, along with ongoing monitoring and evaluation.

B. Uncertainty in the Number of Patients to Be Treated Per Shift

Healthcare centers consistently face high levels of uncertainty regarding patient arrivals and the number of patients to be treated per shift. To address this issue, various authors have proposed solutions that include technologies such as the development of a pre-planned patient registry [14] or a scheduling model to improve appointment management [15]. Similarly, other authors have suggested optimization techniques to determine the optimal number of patients to be treated so that the lack of information about incoming patients does not affect the capacity and quality of healthcare services [16]. Another option is the implementation of an overbooking model to balance delays and risks in patient care [20].

Additionally, there are stochastic simulation strategies that reduce waiting times and support patient management [17], which, when combined with case prioritization, improve healthcare services and minimize the impact of uncertainty [18]. Another potential solution is the use of tools such as patient flow mapping, root cause analysis, and continuous improvement to identify and address issues arising from patient variability [19]. Finally, another alternative is the implementation of a Sequential Notification Procedure (SNP) to address unexpected interruptions in medical appointment schedules [21].

Considering the uncertainty regarding the number of patients to be treated per shift, it is concluded that the most promising approach is the SNP, as its sequential notification procedure dynamically addresses real-time changes in medical appointments, reducing excessive waiting times and variations in physicians' schedules [21].

C. Physician Punctuality Issues

Upon reviewing research related to schedule noncompliance, a close relationship was found between counterproductive work behavior (CWB) and punctuality. In this regard, authors suggest the importance of developing solution plans to address tardiness [22]. Moreover, they propose an effective strategy based on reminders that emphasize the importance of the work and promote intrinsic motivation [23]. Other alternatives suggest improvements through information systems for hospital administrative management; however, these could involve costs that many healthcare centers may not be able to afford [24]. Lastly, adaptive leadership is highlighted as a strategy to reduce tardiness and other counterproductive behaviors [25].

It is concluded that the strategy of reminders and intrinsic motivation is the most viable, effective, and applicable across various work contexts, without high costs, and is particularly relevant for addressing physician punctuality and improving efficiency.

III. CONTRIBUTION

The research focuses on the design and implementation of a model that addresses the challenges faced by the polyclinic. The model has been developed based on contributions that best align with the categories described previously.

A. Foundation

To reduce waiting times in the patient care process and improve efficiency and quality of care, a management model based on the DMAIC methodology (Define, Measure, Analyze, Improve, and Control) is proposed. This model incorporates strategies to manage the uncertainty in the number of patients to be treated by adapting the sequential notification procedure and promotes intrinsic motivation among staff through reminder strategies that emphasize the impact of the medical staff's work. The model's implementation will be carried out gradually, following the phases of the DMAIC methodology, and is expected to generate benefits such as reduced waiting times, optimized resources, and increased satisfaction among both patients and staff.

B. Overview

The proposed model is based on the combination of three components. See Figure 1.

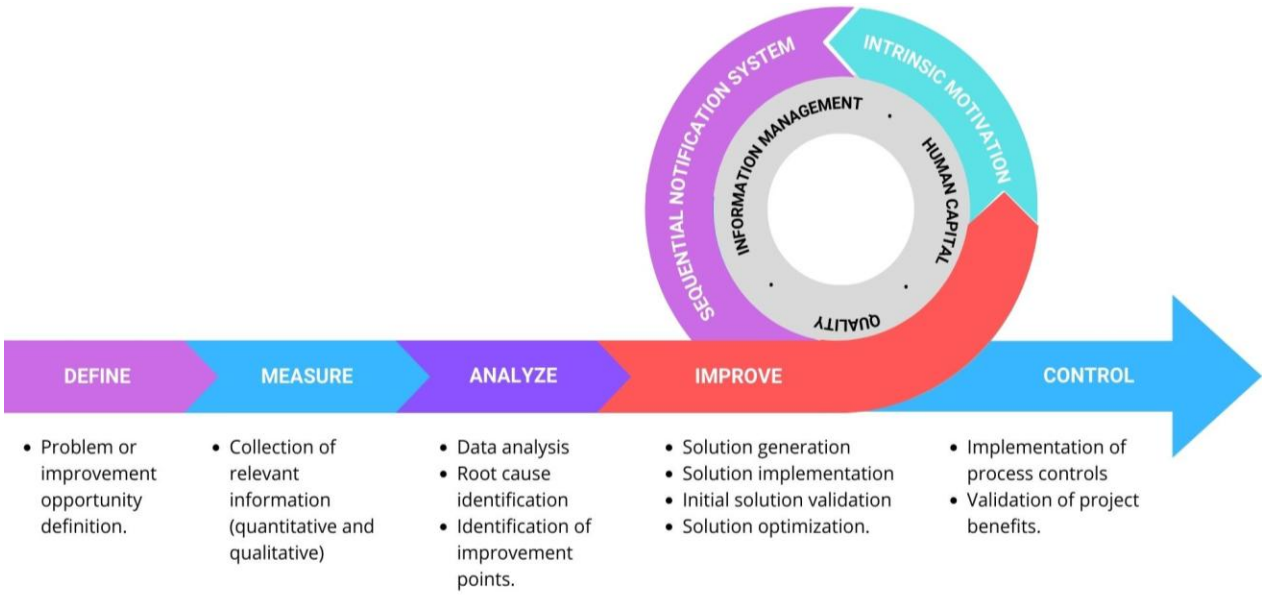

Fig. 1 Proposed Management Model for Reducing Waiting Time

1) DMAIC Methodology

The implementation of the DMAIC methodology at the polyclinic aims to reduce waiting times and improve the quality of medical services. Through the systematic application of this methodology, the goal is to identify and address the root causes of prolonged waiting times and deficiencies in service quality. Corrective and preventive actions will be developed and implemented to optimize healthcare processes, enhance operational efficiency, and ensure a satisfactory patient experience. The implementation of the DMAIC methodology will be comprehensive and tailored to the specific needs and characteristics of the polyclinic, with the objective of achieving significant and sustainable improvements in the management of waiting times and the quality of medical services.

2) Sequential Notification Procedure (SNP)

This component is implemented to improve the management of medical appointments and reduce waiting times. It will achieve this by adjusting the schedule in real time, reducing waiting times, and avoiding overcrowding, thereby improving the patient's experience. Additionally, it seeks to enhance operational efficiency and service quality by enabling medical staff to better plan their activities. The implementation of the SNP will be aligned with the economic realities of the polyclinic, ensuring its long-term viability and sustainability.

To properly implement the sequential notification system, the improvement proposal includes using an ERP system that meets the requirements of this component. After an evaluation process, Medesk was identified as the system best suited to the polyclinic's needs, offering a user-friendly interface, ease of understanding, and an affordable price.

3) Intrinsic Motivation

The purpose of this component is to implement effective intrinsic motivation strategies within the polyclinic to improve the punctuality of medical staff. By recognizing achievements, offering opportunities for professional development, and fostering a sense of belonging, the goal is to increase physicians' commitment and job satisfaction. This will not only ensure adherence to schedules but also enhance service quality and the overall operation of the polyclinic, contributing to an optimal patient experience and organizational success.

C. Details

The proposed model is composed of three components, which are integrated into three sub-processes of the polyclinic, all interrelated to achieve the reduction of patient waiting times.

Initially, the quality sub-process has been designated as the foundational sub-process, as all activities will be focused on the guidelines of ISO 9001:2015, which emphasizes customer satisfaction.

Continuing along these lines, all activities in the Quality sub-process relate to those in Human Capital. It is worth noting that this sub-process begins with the intrinsic motivation of staff members. This serves as the foundation for involving them in the plans and goals to be developed at the polyclinic through a communication meeting. In this meeting, performance indicators are established, which will later allow for tracking progress. Next, roles and responsibilities are clarified, facilitating the execution of activities and improving visibility into task completion. Ultimately, this process aims to recognize the achievement of goals.

Subsequently, the Information Management Process is incorporated. This process is critical to the proposal as it enables the storage of patient information in a way that is more accessible to staff, preventing data loss and delays caused by searching for information.

Continuing with the mapped activities, the Medical Care and Administration processes reflect the implementation of the new resource to be used as part of the Information Management Process. Following this reasoning, after changes in the flow of the medical care process, efficiency indicators will be established to monitor the reduction in patient waiting times to enter the consultation room.

D. Tentative Process

With the implementation of this model, composed of the three previously mentioned components, the goal is to reduce patient waiting times to access the consultation room. As shown in Figure 2, patients have two options for scheduling an appointment. The first option is to schedule it through the chosen ERP system, Medesk. The second option is to visit the polyclinic, where a nursing technician will assist them in booking an appointment according to the available schedule.

In either case, the patient must arrive on time for their appointment. Afterward, they will proceed with triage and administration, where they can finalize the payment for their medical care. Depending on whether the patient is new or has an existing medical record at the polyclinic, the nursing technician will either create or retrieve their record in the Medesk ERP system. Following this, vital signs and measurements corresponding to the triage process are taken, recorded in the digital medical history, and forwarded to the doctor's inbox.

The patient, after being called by the doctor, enters the consultation room where the healthcare professional proceeds with the examination and diagnosis. If the patient requires complementary laboratory tests for diagnosis, the doctor registers the order in the system. Once the results are available, the patient is diagnosed, and the necessary medications are prescribed.

It is important to highlight that the healthcare professional must record all observations, symptoms, laboratory requests, prescribed medications, and the final diagnosis in the Medesk system. This is essential to ensure proper information management.

It is worth noting that having all information correctly recorded will significantly guarantee proper tracking and control of the polyclinic's available resources. Additionally, it will maintain a consistent medical history for each patient, ensuring accurate records of their medical background.

E. Indicators

1) Indicator of Compliance with Work Schedule: Objective: Measure the percentage of adherence to the scheduled arrival time of the polyclinic's staff.

$$\frac{Shifts\ started\ at\ the\ scheduled\ time}{Total\ number\ of\ medical\ shifts} x100 \qquad (1)$$

Indicators:

< 55%	Insufficient
> 55% & <70%	Regular
> 70%	Acceptable

Interpretation: Considering that the polyclinic's operating hours are from 8:00 AM to 1:00 PM and 4:00 PM to 7:00 PM, it is expected that medical services begin no later than 10 minutes after opening. Achieving a result above 70% will ensure compliance with the planned medical services.

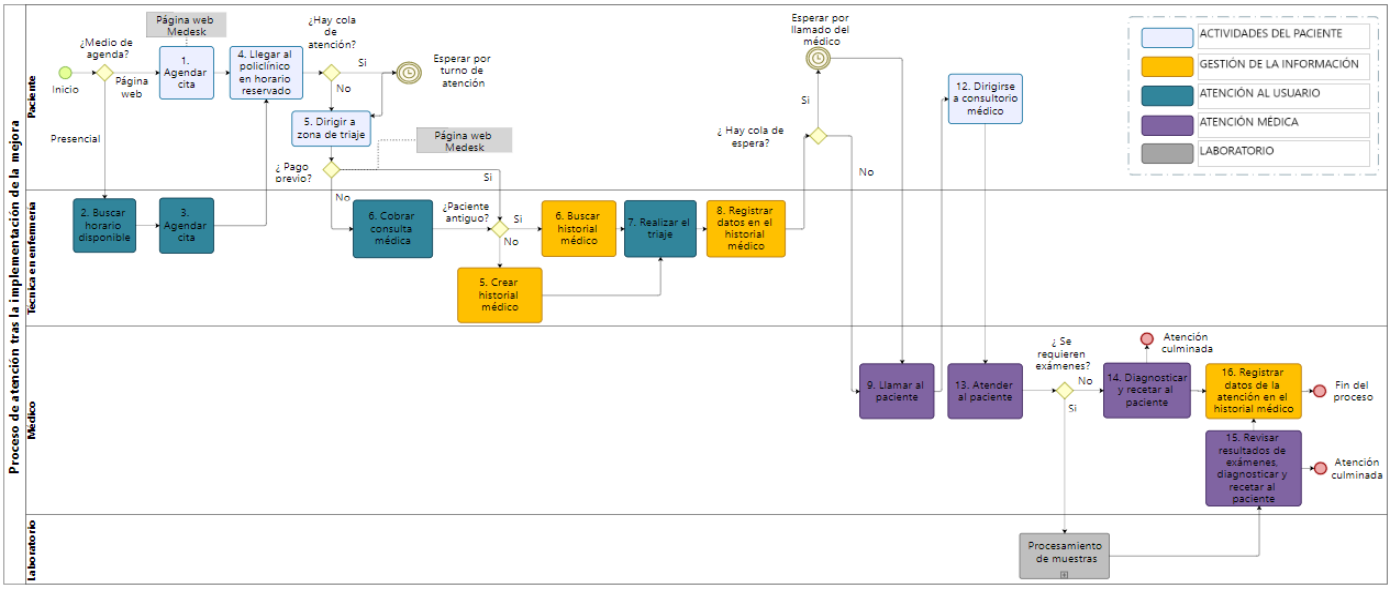

Fig. 2 Patient Care Process After Model Implementation

2) Indicator of Medical Appointments Scheduled in Advance

Objective: Determine the percentage of medical appointments attended with prior scheduling in the ERP software.

$$\frac{Medical\ appointments\ scheduled\ (Medesk)}{Total\ medical\ appointments} x100 \quad (2)$$

Indicators:

< 10%	Insufficient
> 10% & <40%	Regular
> 40%	Acceptable

Interpretation: This indicator will show the percentage of medical services with prior scheduling through the ERP. Ideally, during the initial phase, at least 40% should be achieved, considering public adaptation to the system and possible ERP-related incidents. If the expected results are not met, alternative strategies should be evaluated to encourage patients to use the ERP.

3) Indicator of Compliance with Optimal Waiting Times

Objective: Measure the percentage of medical services provided within optimal waiting times.

$$\frac{Medical\ services\ with\ optimal\ waiting\ times}{Total\ medical\ services} x100 \quad (3)$$

Indicators:

< 50%	Insufficient
> 50% & <70%	Regular
> 70%	Acceptable

Interpretation: Optimal waiting time refers to a maximum of 50 minutes before entering the consultation. It is expected that results exceed 70%; however, percentages above 50% are considered promising, as the adaptation period following the implementation of improvements justifies this. If the percentage is below 50%, processes should be reevaluated to address activities that do not add value.

4) Indicator of Success in Evaluating Intrinsic Motivation

Objective: Determine the percentage of employees who agree or strongly agree with statements related to intrinsic motivation in a survey conducted.

$$\frac{Number\ of\ employees\ who\ agree\ or\ strongly\ agr}{Total\ number\ of\ employees\ surveyed} \quad (4)$$

Indicators:

< 50%	Insufficient
> 50% & <80%	Regular
> 80%	Acceptable

Interpretation: If the results show that more than 80% of employees are motivated to perform their tasks effectively, it demonstrates the effectiveness of the activities carried out to promote intrinsic motivation.

IV. VALIDATION

A. Scenario

The case study is set in a private polyclinic located in the province of Chincha, Peru. It provides primary care (level I-3), offering community medical services, a rapid testing laboratory, and sample collection.

B. Initial Diagnosis

The polyclinic in question has deficiencies in its patient care process, with its primary issue being long waiting times. On average, during each workday, patients wait 125 minutes to enter the doctor's office from the time they arrive. This figure reflects a lack of competitiveness and inefficiency in the patient care process, negatively impacting patient satisfaction. Other relevant figures that highlight the polyclinic's situation include:

1) The absence of an appointment management system and non-compliance with working hours result in a loss of 7 medical consultations per day.

2) The loss of medical consultations leads to a monthly economic loss of S/ 2,016.

3) The loss of medical consultations also generates a monthly financial loss of S/ 11,424 from medical consultations and laboratory analyses.

C. Results

To validate the effectiveness of the proposed management model, a comprehensive comparison was conducted between the initial values of the indicators, reflecting the problematic scenario, and the results obtained after implementing the improvements. This evaluation provided a clear perspective on the impact of the interventions.

Firstly, there was a significant reduction in delays at the start of care, with the on-time arrival of the on-duty physicians. This notable change not only improved punctuality in starting consultations but also contributed to a more equitable and efficient distribution of the workload among medical staff, resulting in a tangible improvement in the quality of care provided.

In line with this, measures were implemented to increase efficiency in managing medical appointments through an ERP (Enterprise Resource Planning) system. This initiative allowed for more agile and accurate management of physicians' schedules, as well as an optimized process for assigning appointments to patients. As a result, the polyclinic demonstrated a substantial improvement in its capacity to attend to a greater number of patients within a given time frame, leading to a significant reduction in waiting times and greater satisfaction among service users.

V. IMPLEMENTATION

The implementation of these improvements has not only generated tangible benefits in terms of operational efficiency and quality of care but has also strengthened the reputation and trust in the polyclinic within the community it serves. These

results support the effectiveness of the proposed management model and highlight the importance of innovation and adaptability in the healthcare sector to address challenges and continuously improve the quality of services offered.

TABLE I
RESULTS OF THE INITIAL PROCESS FOR MEDICAL CARE AT A PRIVATE POLYCLINIC IN CHINCHA

Indicator	Total
Indicator of compliance with working hours for medical care	25%
Indicator of medical consultations with pre-scheduled appointments	0%
Indicator of compliance with optimal waiting times	125 min
Success indicator corresponding to the evaluation of intrinsic motivation	50%

The initial analysis presented in Table 1 reveals a critical situation regarding the service provided by the polyclinic. Significant non-compliance with working hours is observed, with medical staff operating more than two hours behind the established schedule. These delays have resulted in considerable patient care backlogs, which not only affect service efficiency but may also compromise the health of patients requiring immediate medical attention.

Additionally, the absence of scheduled appointments has led to consultations being conducted on a first-come, first-served basis, resulting in long lines, overcrowding, and an uncomfortable atmosphere in the waiting room. This lack of organization in service management has also contributed to excessive waiting times, with three out of four patients experiencing significant delays in their care.

These prolonged waiting times not only increase patient anxiety and discomfort but may also negatively impact their health and well-being, particularly in cases of urgent or painful medical conditions.

The demotivation of medical staff is another concerning factor and can be attributed to various causes, such as excessive workloads, resource shortages, poor organization, and the lack of adequate incentives. This situation not only affects the quality of medical care but also creates a negative work environment that hinders the overall functioning of the polyclinic. The lack of motivation among medical staff can have serious consequences, such as a decline in care quality, an increase in medical errors, and lower patient satisfaction.

Following the implementation of improvement measures, indicators were reassessed to perform a comparative analysis. These measures included restructuring working hours, implementing a system for scheduled appointments, improving resource management, and introducing incentive programs for medical staff. These interventions aimed to enhance service efficiency, reduce waiting times, and increase satisfaction among both medical staff and patients.

TABLE II
COMPARATIVE TABLE OF RESULTS AFTER IMPLEMENTING IMPROVEMENTS IN THE PATIENT CARE PROCESS AT A PRIVATE POLYCLINIC IN CHINCHA

Indicator	Initial Metric	Final Metric	Percentage of Improvement
Indicator of compliance with working hours	25%	79%	54%
Indicator of medical consultations with prior appointments	0%	56%	56%
Indicator of compliance with optimal waiting times	125 min	49 min	61%
Success indicator corresponding to the evaluation of intrinsic motivation	50%	80%	30%

VI. DISCUSSION

Key Results:

1) Significant Reduction in Waiting Times: Following the implementation of the management model, the average patient waiting time was reduced by 61%. This substantial decrease indicates a significant improvement in system efficiency, with patients now spending considerably less time waiting to be seen by a healthcare provider. This reduction not only enhances the patient experience by alleviating anxiety and discomfort associated with prolonged waiting times but also optimizes the use of medical staff's time and the polyclinic's resources.

2) Higher Proportion of Scheduled Appointments: The percentage of pre-scheduled medical appointments increased from 0% to 42% after the implementation of the management model. This change reflects a more organized and efficient approach to patient scheduling, which significantly contributes to reduced waiting times and better utilization of available resources. Furthermore, scheduling appointments in advance allows for a more equitable distribution of workload among medical staff, thereby improving the polyclinic's operational efficiency.

3) Improved Compliance with Optimal Waiting Times: The proportion of patients experiencing waiting times within optimal limits increased from 25% to 79% with the implementation of the management model. This significant increase in adherence to established waiting times indicates a substantial improvement in the polyclinic's ability to ensure patients are attended to within a reasonable timeframe. This improvement not only benefits patient satisfaction but also demonstrates the effectiveness of the management model in optimizing internal processes and enhancing the overall quality of medical care provided.

4) Increased Intrinsic Motivation Among Staff: After the implementation of the management model, there was a 30% increase in the intrinsic motivation score among medical and administrative staff. This positive change suggests greater engagement and motivation in their daily work, which can have a significant impact on the quality of patient care and the polyclinic's operational efficiency. Staff intrinsic motivation is

essential for fostering a positive and collaborative work environment, which in turn contributes to a better patient experience and more positive health outcomes overall.

In Conclusion:

Overall, the implementation of the management model has yielded remarkable results by reducing waiting times, improving appointment scheduling, ensuring compliance with optimal waiting times, and increasing staff motivation. These positive outcomes demonstrate the model's effectiveness in optimizing patient care processes and creating a more efficient, patient-centered healthcare environment. These achievements directly benefit patients by improving their experience and health outcomes while also enhancing the polyclinic's reputation and operational effectiveness.

A. New Results vs. Original Findings

Following the initial case study conducted during a single shift at the polyclinic, additional validations were performed to ensure greater accuracy and reliability of the obtained results. These validations included replicating the study during the shifts of three different doctors within the polyclinic, allowing for an assessment of the generalizability of the findings and the robustness of the implemented personnel management model.

In each of these additional scenarios, results were consistent with those initially obtained. Following the implementation of the ERP system, which enables efficient appointment management, an average reduction in waiting times was recorded across all evaluated shifts. These additional results reinforce the validity and effectiveness of the personnel management model implemented in the polyclinic of Chincha, demonstrating that the observed improvements are not isolated cases but can be generalized to other environments with limited resources.

It is important to emphasize that conducting additional simulations and validating results across different scenarios strengthens confidence in the effectiveness and applicability of the proposed intrinsic motivation model. These findings suggest that the observed improvements in waiting times are not merely the result of particular or random circumstances but are the product of a systematic and well-founded approach to enhancing efficiency and the quality of medical care at the Chincha polyclinic.

Furthermore, these results support the proposed idea that the model can have a positive and generalizable impact on reducing waiting times in other healthcare centers with similar characteristics. This generalization of the results suggests that the personnel management model developed in this study could be applicable to other contexts and healthcare environments, thus contributing to improving the accessibility and quality of health services in communities with limited resources.

B. Analysis of Results

To conduct a thorough analysis of the obtained results, a statistical criteria-based approach was employed, utilizing an indicator matrix that included validated scenarios and corresponding evaluation criteria. This matrix allowed for a detailed and systematic assessment of the effectiveness of the personnel management model implemented in the Chincha polyclinic.

The results indicate a progressive improvement in the efficiency and quality of medical care at the Chincha polyclinic, further supporting the effectiveness of the implemented personnel management model.

The detailed data for these indicators is presented in the following table:

TABLE III
RESULTS OBTAINED FOR EACH PHYSICIAN EVALUATED AT THE CHINCHA POLYCLINIC

Indicator	1	2	3
Compliance with Waiting Times	55 min	46 min	46 min
Compliance with Working Hours	80%	85%	72%
Appointments with Prior Scheduling	48%	60%	60%

When analyzing the results obtained for each physician evaluated at the Chincha Polyclinic, both similarities and significant differences in their performance are highlighted. In terms of similarities, all three physicians exhibit notably high compliance with working hours, suggesting good time management and a willingness to attend to patients as scheduled. Additionally, there is a general trend toward improved compliance with waiting times, with all physicians achieving percentages around 80%.

However, when examining the differences, variations are observed in the percentage of appointments with prior scheduling, where Physician 2 excels with 60%, followed by Physician 3 with another 60%, while Physician 1 registers 48%. This discrepancy suggests potential differences in the efficiency of appointment management and schedule planning among the physicians. Furthermore, although all three physicians show a high degree of compliance overall, there is slight variability in their respective percentages for waiting time and working hour compliance, which could be attributed to individual factors such as experience, workload, and patient preferences.

Ultimately, these results indicate a progressive improvement in the efficiency and quality of medical care at the Chincha Polyclinic, supporting the effectiveness of the personnel management model implemented.

C. Future Work

The study has identified several promising areas for future research aimed at further improving the efficiency and quality of medical care at the Chincha Polyclinic. One key area to explore is the integration of emerging technologies, such as artificial intelligence, to further optimize the appointment management system. For instance, by employing machine learning algorithms, it could become possible to more accurately predict demand peaks and dynamically adjust appointment scheduling and resource allocation to meet the changing needs of patients.

Additionally, other technological innovations could be explored to enhance the application of the model, such as the implementation of telemedicine systems for virtual consultations or the introduction of wearable health monitoring

devices that enable remote patient tracking. These tools could help reduce the workload on medical staff and improve patient access to care, particularly in remote areas or those with limited resources.

Another important area for future research is the development of predictive models to identify patients at higher risk of delays in care or medical complications. By analyzing clinical and demographic data, along with the use of advanced data analysis techniques such as data mining and predictive modeling, it may be possible to identify patterns and risk factors that enable early intervention and more personalized care.

In summary, future research could focus on leveraging emerging technologies and advanced analytical tools to optimize appointment management, improve access to medical care, and provide more personalized, patient-centered care at the Chincha Polyclinic.

VII. Conclusion

In summary, the implementation of strategies aimed at strengthening the intrinsic motivation of staff and the introduction of a medical records digitization system, using the DMAIC methodology, has emerged as a highly effective approach to enhancing the quality of patient care services at the polyclinic.

Although not all the suggested corrective measures have been fully implemented, significant improvements have been observed, such as the initiation of the medical records digitization process and a tangible commitment from the staff to achieve the proposed objectives.

These results highlight the critical importance of considering both staff motivation and the integration of digital technologies as essential components in transformation processes aimed at improving care in health centers.

Moreover, these advancements are already reflected in the primary indicator: a remarkable 61% reduction in patient waiting times for care at the polyclinic under study has been achieved, translating to an average waiting time of approximately 49 minutes.

These encouraging results not only validate the effectiveness of the implemented measures but also underscore the positive impact they can have on the patient experience and the optimization of the operational efficiency of the health center.

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