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The Impact Of Preoperative Optimization In Patients With Chronic Comorbidities: A Prospective Study In Surgical Internal Medicine Of Veracruz

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ABSTRACT

Introduction: This research aims to systematically review the existing scientific literature on the effects of preoperative optimization on patients with chronic diseases. The focus is on reducing perioperative complications, improving clinical outcomes, and enhancing the effectiveness of care in surgical internal medicine.

Methods: A systematic review was conducted according to PRISMA guidelines using 20 articles from Scopus and Web of Science published between 2020 and 2025. The selected studies addressed interventions such as comprehensive geriatric assessments, remote care, anemia management, anticoagulation reversal, prehabilitation, and risk stratification tools.

Results: The results indicate an overall trend toward decreased adverse events after surgery, improved functional recovery, and reduced hospitalization duration in patients with comorbidities such as hypertension, diabetes, kidney disease, depression, and frailty.

Conclusions: The study concludes that preoperative optimization, when carried out in a multidisciplinary manner with a clear protocol, significantly improves the quality of surgical care for complex patients. This represents an evidence-based practice that should be integrated as an essential component of the surgical process. In this way, the study provides a basis for developing institutional policies and future research aimed at confirming the efficacy and sustainability of preoperative optimization in different clinical contexts.

Keywords: surgical internal medicine, preoperative, comorbidities

HIGHLIGHTS

- Preoperative optimization, especially in patients with chronic diseases, is crucial for reducing perioperative complications, improving clinical outcomes, and increasing the effectiveness of care in surgical internal medicine.
- Effective preoperative optimization strategies include telehealth for outpatient assessment, correction of anemia, anticoagulant management, physical and nutritional prehabilitation, and implementation of predictive models covering pathophysiological, functional, and emotional aspects.
- Recent studies indicate a general trend toward a decrease in post-surgical adverse events, improved functional recovery, and reduced length of hospital stay in patients with comorbidities such as hypertension, diabetes, kidney disease, depression, and frailty.

- Preoperative optimization promotes interdisciplinary collaboration between internists, surgeons, anesthesiologists, nurses, and rehabilitation professionals, establishing a more holistic and patient-centered model of care.
- Despite evidence supporting its effectiveness, the implementation of preoperative optimization still faces significant obstacles, such as low referral rates of high-risk patients to these programs (oNly between 20% and 53%) and the lack of standardized protocols.

INTRODUCTION

The need for pre-surgical care in chronic disease patients has significantly increased, driven by an aging global population and the rising prevalence of non-communicable chronic illnesses. Conditions like hypertension, diabetes, chronic kidney disease, and heart and lung problems demonstrably heighten the risk of perioperative complications, extending hospital stays, and increasing morbidity and mortality. As Warwick and Moonesinghe[1] state, "patients with chronic pathologies need a planned and prior approach to reduce surgical risks, as these comorbidities are factors that independently affect negative outcomes."

Research consistently shows that implementing medical optimization strategies before surgery improves health outcomes and reduces complications. Stopkuchen-Evans[2] defines preoperative optimization as "a set of medical practices that seek to improve the patient's physical condition before an operation, reducing adverse events and promoting a more agile recovery." This encompasses a range of interventions, including metabolic management, blood pressure stabilization, medication adjustments, nutritional assessment, and functional preparation through prehabilitation.

Numerous studies confirm these benefits. Endeshaw et al[3] found that "the presence of comorbidities doubles the risk of death within 28 days for surgical patients," emphasizing the need for systematic preoperative interventions. Leeds et al[4] reported that patients in preoperative optimization programs experienced 31% fewer complications.

Optimizing patients for surgery requires more than individual medical interventions; it demands multidisciplinary team efforts. Dooley et al[5] highlight that "collaboration between internal medicine, anesthesiology, rehabilitation, and skilled nursing facilitates individualized care, focused on risk assessment and joint decision-making." This collaboration has led to effective organizational models like specialized pre-intervention clinics, particularly beneficial for geriatric and oncological populations.

Prehabilitation programs, integrating adaptive exercise, nutritional support, and mental preparation, are valuable complementary interventions. Stopkuchen-Evans[2] notes that "prehabilitation has been demonstrated to enhance the patient's functional capacity, thereby reducing the probability of respiratory complications, infections, and cardiovascular events in the immediate postoperative period." This strategy proves particularly effective for elderly, frail, or high-burden patients.

Despite clear benefits, implementation faces significant obstacles. Howard et al[6] found that "only between 20% and 53% of patients considered high-risk are referred to preoperative optimization programs," indicating gaps in institutional referral procedures, lack of standardized protocols, and insufficient knowledge among surgical teams. Educational interventions and clinical algorithms, as shown by Howard et al[6] who observed an 860% increase in referrals after implementing an educational algorithm for abdominal hernia patients, can promote adherence and facilitate early detection of high-risk patients.

Beyond clinical implications, preoperative optimization has significant economic ramifications. Leeds et al[4] emphasize that adequate preoperative medical care reduces resource

utilization post-surgery, preventing prolonged hospital stays and mitigating complication-related expenses. These tactics are thus both clinically effective and economically viable for health system sustainability.

Despite these advantages, there's a need for more systematic knowledge regarding the impact of preoperative optimization on chronic disease patients, particularly within surgical internal medicine. Much existing research focuses on specific subpopulations or isolated specialties, hindering a comprehensive understanding.

Therefore, a thorough, methodical review of current evidence is imperative to synthesize findings, identify knowledge gaps, and guide the implementation of integrated preoperative care models. As Warwick and Moonesinghe[1] noted, "contemporary perioperative medicine must transcend the surgical act and include a comprehensive functional evaluation of the patient prior to entering the operating room."

This study aims to systematically review scientific literature from prominent, high-impact journals indexed in Scopus and/or WoS (2020-2024). It will analyze the impact of preoperative optimization on reducing complications, enhancing clinical outcomes, and improving healthcare system efficiency in patients with chronic comorbidities. This review seeks to establish a comprehensive foundation for clinical decision-making and institutional policy, ensuring safe, effective, and patient-centered surgical care. The primary research question is how to evaluate the effectiveness of preoperative optimization in reducing perioperative complications, improving clinical outcomes, and enhancing the efficiency of care processes in the context of surgical internal medicine.

METHODS

The study employs a qualitative research method. According to Bianchini et al (2015)[7], the objective of qualitative studies is to obtain information for the analysis and interpretation of findings. A search for relevant literature was conducted in the Scopus and Web of Science databases. The search terms used were "surgical internal medicine" and "preoperative comorbidities."

RESEARCH DESIGN

The research has been designed as a systematic review, which encompasses a set of guidelines to carry out the analysis of the data that have been collected, starting from coding to the representation of theories[8] . Furthermore, it is posited that the text employs a descriptive approach, as it endeavors to comprehend the influence of varying levels of the variable. The text is also systematic, as it methodically evaluates the academic material obtained from scientific journals. Moreover, it conducts analyses and interpretations of theories related to knowledge management[9]. The results of this search are treated in the manner illustrated in Figure 1, where the PRISMA technique is used to identify the material being analyzed. It was hypothesized that the publication should have been made between 2020 and 2024, regardless of the country of origin, the area of knowledge, or the type of publication, which includes: A compendium of scholarly publications, including journal articles, reviews, book chapters, and monographs.

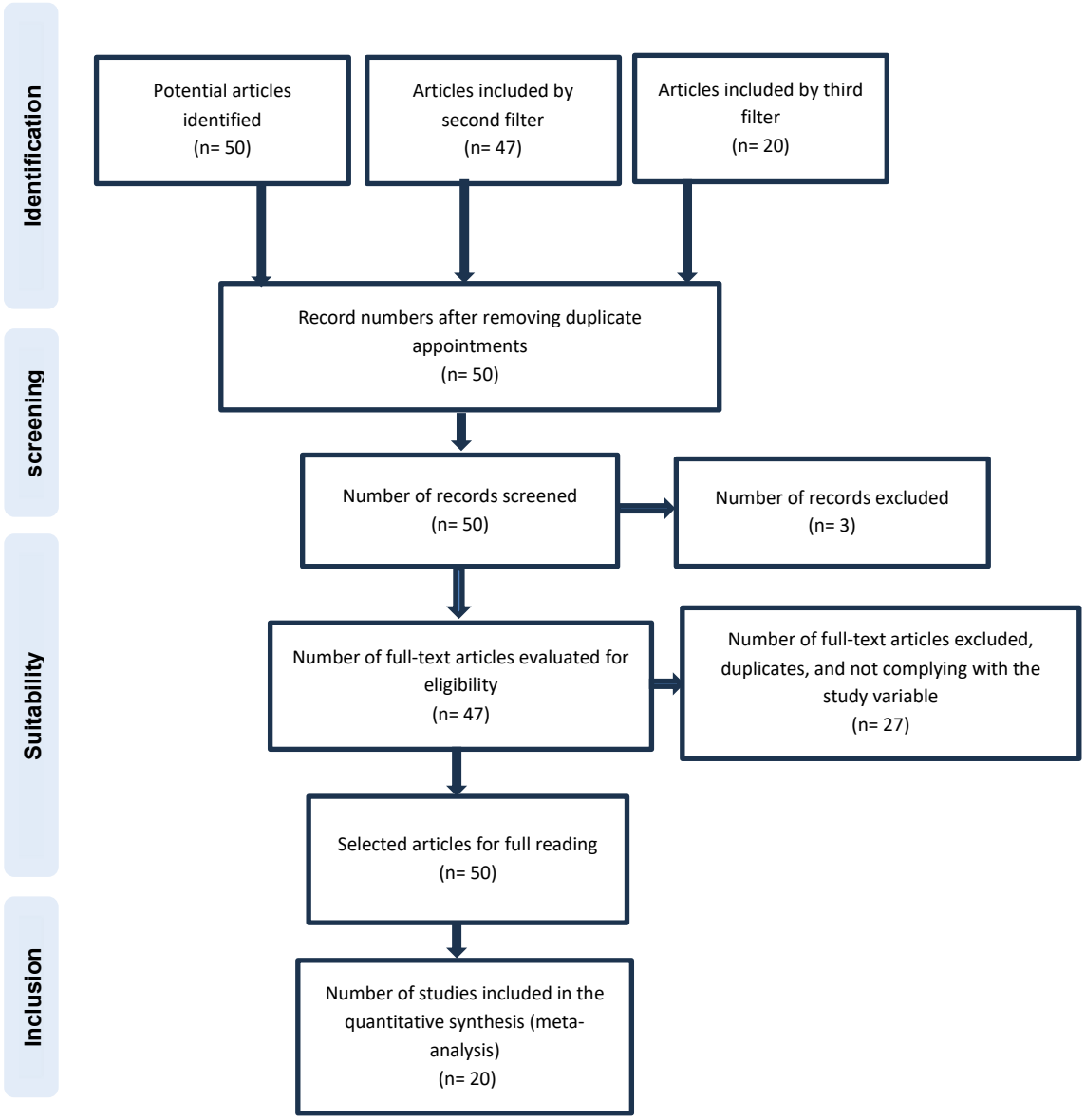

Figure 1. Flowchart of a systematic review carried out under the PRISMA technique
Source: Own elaboration based on the proposal of the Prisma Group

RESULTS

The following table shows the results after applying the search filters related to the methodology proposed for this research, after recognizing the relevance of each of the referenced works.

Table 1 Compilation of articles included in the research.

No.	RESEARCH TITLE	AUTHOR/YEAR	COUNTRY	TYPE OF STUDY	INDEXING
1	Pilot of Outpatient Preoperative Evaluation Through Teleassistance	Machado, C. R., Neves, M. F., Costa, Y., & Lunardi, C. (2023).	BRAZIL	QUALITATIVE	SCOPUS
2	Two surgical pathways for isolated hip fractures: A comparative study	Fokin, A. A., Knight, J. W., Darya, M., Stalder, R., Puente, I., & Weisz, R. D. (2023).	UNITED STATES	QUALITATIVE	SCOPUS
3	Head and neck cancer surgery in elderly patients: the role of frailty assessment	Rothman, S., Zabarqa, S., Pitaro, J., Gavriel, H., Marom, T., & Muallem Kalmovich, L. (2023).	ISRAEL	QUALITATIVE	SCOPUS
4	Postsurgical and Posttraumatic Hyponatremia	Goel, A., & Verbalis, J. G. (2021)	UNITED STATES	QUALITATIVE	SCOPUS
5	Depressive Disorders Lead to Increased Complications After Geriatric Hip Fractures	Broggi, M. S., Oladeji, P. O., Tahmid, S., Hernandez-Irizarry, R., & Allen, J. (2021).	UNITED STATES	QUANTITATIVE	SCOPUS
6	The Advanced Practice Nurse in a Surgical Prehabilitation Program; [Advanced Practice Nurse in Surgical Prehabilitation Program]	García, N. M., & Sánchez, F. J. G. (2023).	SPAIN	QUALITATIVE	SCOPUS

7	Do cancer patients undergoing surgery for a non-neoplastic related fragility hip fracture have worse outcomes? A retrospective study	Rutenberg, T. F., Vitenberg, M., Daglan, E., Pretell-Mazzini, J., & Shemesh, S. (2023)	UNITED STATES, ISRAEL	QUALITATIVE	SCOPUS
8	Management of peri-surgical anemia in elective surgery. Conclusions and recommendations according to Delphi-UCLA methodology; [Management of perisurgical anemia in elective surgery. Conclusions and recommendations according to Delphi-UCLA methodology],	Moral, V., Motos, A. A., Jericó, C., Caamaño, M. A., Melchor, J. R., Vives, E. B., & Erce, J. G. (2024)	SPAIN	QUANTITATIVE/QUALITATIVE	SCOPUS
9	Evaluation of the safety and efficacy of perform enterectomy in colorectal cancer patients aged 80 or older. A meta-analysis and a systematic review,	Chen, B., Yu, W., Ma, Y., Xu, P., Yao, Q., Sun, Q., ... & Wang, D. (2023)	CHINA	QUALITATIVE	SCOPUS

10	Association of Reversal of Anticoagulation Preoperatively on 30-Day Mortality and Outcomes for Hip Fracture Surgery,	Yoo, M. S., Zhu, S., Jiang, S. F., Hammer, H. L., McBride, W. J., McCarthy, C. M., ... & Ananias, M. P. (2020)	UNITED STATES	QUALITATIVE	SCOPUS
11	Update of a Model to Predict Outcomes after Endovascular Aneurysm Repair	Cowled, P., Boult, M., Barnes, M., & Fitridge, R. A. (2021)	AUSTRALIA	QUALITATIVE	SCOPUS
12	Preoperative comorbidities as a predictor of EBWL after bariatric surgery: a retrospective cohort study	Remmel, S., Noom, M., Sandstrom, R., Mhaskar, R., Diab, A. R. F., Sujka, J. A., ... & DuCoin, C. G. (2024).	UNITED STATES	QUALITATIVE	WOS
13	Preoperative Anemia Is Associated With Worse Postoperative Outcomes After Open Reduction Internal Fixation of Distal Radius Fractures	Schmerler, J., Olson, J. T., Prasad, N., & LaPorte, D. (2025).	UNITED STATES	QUALITATIVE	WOS
14	Preoperative chronic steroid use as a risk factor for complications following open reduction internal fixation for proximal humerus fracture	Smolev, E., Lebens, R., Leatherwood, W., Kennedy, J., Komatsu, D. E., & Wang, E. D. (2024)	UNITED STATES	QUALITATIVE	WOS

15	Primary hyperparathyroidism: diagnostic features and surgical outcomes	Bianchini, C., Manuelli, M., Migliorelli, A., Corazzi, V., Ciorba, A., Radica, M. K., ... & Carcoforo, P. (2024).	ITALY	QUANTITATIVE	WOS
16	Recommendations on the use of prehabilitation, i.e. comprehensive preparation of the patient for surgery	Banasiewicz, T., Kobiela, J., Cwaliński, J., Spychalski, P., Przybylska, P., Kornacka, K., ... & Wallner, G. (2023).	POLAND	QUANTITATIVE	WOS
17	Peri- and postoperative morbidity and mortality in older patients with non-small cell lung cancer: a matched-pair study	Safi, S., Gysan, M. R., Weber, D., Behnisch, R., Muley, T., Allgäuer, M., ... & Eichhorn, M. (2024).	GERMANY, AUSTRIA	QUALITATIVE	WOS
18	Comprehensive Peri-Operative Risk Assessment and Management of Geriatric Patients	Theodorakis, N., Nikolaou, M., Hitas, C., Anagnostou, D., Kreouzi, M., Kalantzi, S., ... & Papaconstantinou, I. (2024).	GREECE	QUANTITATIVE	WOS
19	Impact of maze procedure in patients with severe tricuspid regurgitation and persistent atrial fibrillation	Park, I., Jeong, D. S., Park, S. J., Ahn, J. H., Kim, J., Kim, E. K., ... & Park, P. W. (2023).	REPUBLIC OF KOREA	QUALITATIVE	WOS

20	Chronic kidney disease impacts outcomes after abdominal aortic aneurysm repair	Pizano, A., Scott, C. K., Porras-Colon, J., Driessen, A. L., Miller, R. T., Timaran, C. H., ... & Ramanan, B. (2023).	UNITED STATES	QUALITATIVE	WOS

A systematic review of 20 recent studies (2020–2025) highlights a consistent focus on preoperative optimization to improve surgical outcomes for chronic disease patients. These strategies aim to reduce complications, enhance clinical results, and improve care efficiency. Telecare emerges as a crucial element, streamlining processes and improving inter-specialty communication, as demonstrated by Machado et al[10] in Brazil, who found a significant reduction in time from surgical recommendation to authorization through remote assessment.

The psycho-emotional dimension is strongly emphasized. Broggi et al[11] note that "preoperative depression is a known risk factor for postoperative complications in orthopedic surgery," underscoring the need for mental health assessments to mitigate adverse clinical risks and minimize negative postoperative events. This is supported by geriatric research linking depression to slower physical therapy recovery[12], connecting preoperative optimization with improved functional recovery.

In geriatric research, Rothman et al[13] stress the importance of frailty assessment in head and neck cancer patients to "facilitate functional recovery," highlighting the need to identify functional limitations pre-surgery for personalized treatment and improved outcomes. Remmel et al[14] further reinforced this, finding that depression tripled the likelihood of a poor functional outcome in elderly Italian hip fracture patients.

The significance of prehabilitation, often guided by advanced nursing, is evident. García and Sánchez[15] in Spain suggest nursing involvement enhances treatment adherence and reduces adverse events. The integration of multidisciplinary teams for presurgical preparation is a key finding, with Banasiewicz et al[16] from Poland providing evidence that physical and psychological prehabilitation elements enhance postoperative outcomes.

The review also thoroughly examines physiological factors like preoperative anemia and anticoagulation. Schmerler et al[17] demonstrated that "preoperative anemia is associated with worse outcomes after surgery," indicating that normalizing hemoglobin levels improves surgical safety. Yoo et al[18] found that anticoagulation reversibility prior to hip fracture surgery notably reduced 30-day mortality, emphasizing the importance of differentiated protocols based on comorbidities. Moral et al[19] in Spain also showed the effectiveness of anemia treatment and nutritional strategies.

Park et al[20] in South Korea highlighted that cardiovascular comorbidities, such as atrial fibrillation, are associated with unfavorable postoperative outcomes, necessitating comprehensive cardiology evaluation before surgery. Theodorakis et al[21] from Greece asserted that "a comprehensive assessment of geriatric risk in the perioperative period improves both safety and clinical efficiency." Safi et al[22] in Germany and Austria found that a multidisciplinary approach to lung cancer surgery "increases survival and decreases morbidity," demonstrating optimization benefits even in complex scenarios.

Global evidence supports these strategies. Chen et al[23] in China concluded that well-structured preoperative strategies enhance enterectomies in older adults, reducing intestinal complications.

Rutenberg et al[24], combining USA and Israeli data, showed a multidisciplinary approach to hip fractures in cancer patients significantly improved postoperative mobility and reduced complications. Cowled et al[25]from Australia demonstrated the capacity of clinical tools to predict outcomes and personalize treatments in endovascular aneurysms, leading to improved medical precision.

This systematic analysis reveals a clear trend towards adopting preoperative optimization strategies as effective tools to improve surgical care in chronic disease patients. The studies show significant geographical, methodological, and clinical variability, supporting the general applicability of these interventions. They encompass telemedicine [10], assessment of specific risk factors like depression [11], anemia[17], and frailty in older adults[13]. Despite heterogeneous designs and settings, a substantial overlap was observed in clinical outcomes, including reduced postoperative complications, decreased short-term mortality, and enhanced functional recovery. These findings benefit patient evolution and optimize hospital resource utilization, aligning with the study's main objective. The evidence strongly suggests the need to systematically incorporate integrated optimization models into surgical protocols, particularly within surgical internal medicine units, advocating for a more preventive, personalized, and cost-efficient approach to care.

Keyword Co-Occurrence

Figure 2 shows the relationship between the keywords used to search for the study material for the elaboration of the systematic analysis proposed for this research.

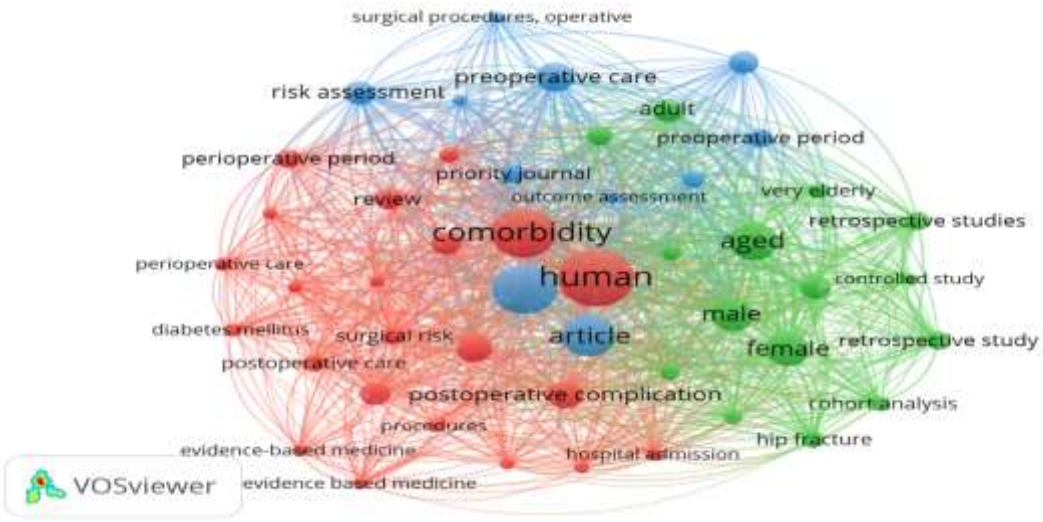

Figure 2. Co-occurrence of keywords.
Source: Own elaboration

A comprehensive analysis of keyword co-occurrence reveals a clear thematic structure centering on preoperative optimization for patients with chronic diseases. Terms like comorbidity, preoperative care, risk assessment, postoperative complication, and perioperative period frequently appear together. This highlights the scientific literature's recognition of the critical link between existing comorbidities and the need for systematic care before, during, and after surgery. This reinforces the

core idea that preoperative optimization isn't an isolated event, but an integral part of the surgical care cycle, especially for chronic disease patients.

The prominence of terms like "human," "elderly," "male," "female," "very old," and "adult" indicates a focus on specific clinical patient groups, particularly older adults, aligning with the epidemiological profile of patients in the reviewed studies. A similar connection between hip fracture, hospital admission, and comorbidity suggests that acute conditions in chronic settings are a primary context for implementing optimization strategies, supported by research in fractures, orthopedic surgery, and geriatrics.

The recurring mention of "surgical risk," "outcome assessment," "controlled study," and "retrospective study" signals the scientific community's drive to apply preoperative interventions and rigorously measure clinical outcomes and predictors. This objective is further supported by studies employing functional assessment models within this review.

Frequent associations between evidence-based medicine, review, perioperative care, and diabetes mellitus underscore the current effort to base clinical decisions on validated data and the growing concern for metabolic disease patients requiring specific presurgical preparation. Overall, this co-occurrence map confirms that recent scientific discourse emphasizes integrating risk analysis, comorbid status, and quality preoperative care into a cohesive strategy to reduce postoperative complications. This further validates the objectives and methodological approach of this systematic review.

5. CONCLUSIONS

This systematic review substantiates the efficacy of the optimization of patients with chronic comorbidities prior to surgery from both a clinical and an organizational standpoint in the context of surgical internal medicine. The twenty studies reviewed here, which were conducted in various contexts and with multiple methodological approaches, reached a consensus that the implementation of structured preoperative tactics—whether clinical, functional, nutritional, or technological in nature—significantly reduces postoperative complications, improves clinical outcomes in both the short and long term, and enhances the effectiveness of care processes.

The most effective interventions identified include telecare for outpatient assessment, correction of anemia, and management of anticoagulants prior to surgery. Additional effective interventions include physical and nutritional prehabilitation under the supervision of skilled nursing and the implementation of predictive models that cover pathophysiological, functional, and emotional aspects. These strategies have been shown to enhance safety in surgical procedures and promote expedited recovery, particularly in elderly individuals or those with multiple comorbidities.

From an organizational perspective, pre-surgery optimization fosters interdisciplinary collaboration among internists, surgeons, anesthesiologists, nurses, and rehabilitation professionals, thereby establishing a more holistic, patient-centered model of care. The implementation of these practices as institutional protocols should not be a matter of preference; rather, it should be a clinical necessity grounded in substantial and contemporary scientific evidence.

However, there are research gaps that must be addressed in future studies. These gaps include the need for controlled clinical trials, the assessment of the economic impact on different health systems, and the standardization of clinical indicators for follow-up. Furthermore, it is imperative to adapt these strategies to contexts with limited resources by employing simpler and more sustainable models.

In summary, the findings presented herein underscore the imperative for a paradigm shift in the conventional approach to surgery, wherein preoperative optimization is accorded a pivotal and obligatory role. This transformation will not only enhance surgical outcomes but will also

contribute to the sustainability of healthcare systems and the safety of patients in increasingly complex clinical environments.

6. RECOMMENDATIONS FOR FUTURE RESEARCH

Further research is crucial to strengthen the scientific foundation for preoperative optimization in patients with chronic diseases. Firstly, randomized controlled clinical trials are needed to rigorously evaluate individual components of optimization strategies, such as anemia correction, physical preparation, psychosocial interventions, or personalized pharmacology. Such studies would enhance the external validity for widespread implementation.

Secondly, comparative research across diverse international settings is imperative. Most current research focuses on developed countries, limiting generalizability to regions with fewer medical resources. Prioritizing the adaptation and implementation of optimization models in resource-poor environments, particularly in Latin America, Africa, and Asia, is essential.

Thirdly, developing comprehensive predictive models that integrate clinical, functional, psychological, and socioeconomic factors is vital. These models would identify high-risk patients who would benefit most from intensive preoperative interventions, enabling more effective risk stratification and resource allocation in hospitals.

Another crucial area is cost-effectiveness analysis of optimization strategies. While clinical benefits are evident, systematically assessing economic implications—including reduced complications, shorter hospital stays, lower readmission rates, and decreased ICU utilization—is critical for informed, sustainable decisions by health managers.

Additionally, qualitative research is recommended to identify barriers and facilitators for clinical implementation. Understanding the perspectives of medical staff, patients, and administrators is key to developing effective and culturally sensitive adoption strategies.

Finally, it's important to study the long-term impact of optimization strategies. This includes evaluating not just immediate surgical outcomes, but also patients' medium and long-term quality of life, functionality, and autonomy, especially for geriatric, oncology, and complex chronic disease patients, where surgical success extends beyond mere survival.

Ethical approval

Even the study did not require the treatment of human beings, the study was carried out in accordance with the guidelines of the Declaration of Helsinki for the compliance with the ethical, methodological, and legal aspects of this study, as well as the informed consent for the processing of personal data.

Consent

Not applicable

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The research was conducted independently by the researchers, and no funding was received.

Author contributions

The author designed the study, collected data, curated and analyzed the dataset, wrote the first and last version of the manuscript, reviewed and approved the final version of the manuscript.

Conflict of interest disclosure

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Research registration unique identifying number (UIN)
Not applicable

Guarantor
Not applicable

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Not applicable

Data availability statement
All data analyzed was included in the manuscript. Further data will be prepared and provided by the corresponding author under request from editors.

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