

Toma de Decisiones Centrada en el Paciente con Multimorbilidad: Desafíos Actuales para la Medicina Interna Contemporánea

Patient-Centered Decision-Making in Multimorbid Older Adults: Challenges for Contemporary Internal Medicine

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RESUMEN

La multimorbilidad y la complejidad clínica se han convertido en desafíos cada vez más relevantes para la medicina interna contemporánea debido al envejecimiento poblacional, la transición epidemiológica y el aumento de las enfermedades crónicas no transmisibles. La coexistencia de múltiples enfermedades crónicas frecuentemente genera polifarmacia, fragilidad,

deterioro cognitivo, disminución funcional, mayor utilización de servicios de salud y dificultades en la toma de decisiones terapéuticas. El presente artículo de revisión tuvo como objetivo analizar la relación entre multimorbilidad y complejidad clínica dentro de la medicina interna moderna, enfatizando el impacto de la acumulación de enfermedades crónicas, la atención centrada en el paciente, la fragmentación de los sistemas de salud y los determinantes de salud pública, particularmente en contextos latinoamericanos como México, Colombia y Ecuador. Se empleó una metodología de revisión narrativa basada en el Método Científico utilizando literatura científica indexada en PubMed, Scopus, Google Scholar, BMJ Journals y otras bases académicas relacionadas. La evidencia analizada demostró que la multimorbilidad incrementa significativamente la utilización de servicios de salud, los riesgos relacionados con medicamentos, las hospitalizaciones y la complejidad terapéutica, especialmente en poblaciones geriátricas. Los hallazgos también destacaron la importancia del manejo interdisciplinario, la toma de decisiones compartida, la valoración geriátrica integral y la planificación terapéutica individualizada enfocada en la funcionalidad y calidad de vida más que en objetivos aislados centrados en enfermedades específicas. La revisión concluye que la medicina interna moderna requiere modelos de atención integrativos y humanistas capaces de equilibrar la evidencia científica con las prioridades del paciente, los determinantes sociales y la sostenibilidad de los sistemas de salud.

PALABRAS CLAVE

Multimorbilidad, Complejidad clínica, Medicina interna, Geriátrica, Polifarmacia, Fragilidad, Enfermedades crónicas, Atención centrada en el paciente, Toma de decisiones compartida, Salud pública, Sistemas de salud, América Latina, Envejecimiento poblacional, Deterioro funcional, Fragmentación sanitaria

ABSTRACT

Multimorbidity and clinical complexity have become increasingly important challenges in contemporary internal medicine due to demographic aging, epidemiological transition, and the growing prevalence of chronic non-communicable diseases. The coexistence of multiple chronic conditions frequently leads to polypharmacy, frailty, cognitive impairment, functional decline, increased healthcare utilization, and difficulties in therapeutic decision-making. The present review aimed to analyze the relationship between multimorbidity and clinical complexity within modern internal medicine, emphasizing the impact of chronic disease accumulation, patient-centered care, healthcare fragmentation, and public health determinants, particularly in Latin American contexts such as Mexico, Colombia, and Ecuador. A narrative review methodology based on the Scientific Method was employed using scientific literature indexed in PubMed, Scopus, Google Scholar, BMJ Journals, and related academic databases. The analyzed evidence demonstrated that multimorbidity significantly increases healthcare utilization, medication-related risks, hospitalization, and therapeutic complexity, particularly among geriatric populations. The findings additionally highlighted the importance of interdisciplinary management, shared decision-making, comprehensive geriatric assessment, and individualized therapeutic planning focused on functionality and quality of life rather than isolated disease-centered targets. The review concludes that modern internal medicine requires integrative and humanistic healthcare models capable of balancing scientific evidence with patient priorities, social determinants, and long-term healthcare sustainability.

KEYWORDS

Multimorbidity, Clinical complexity, Internal medicine, Geriatrics, Polypharmacy, Frailty, Chronic diseases, Patient-centered care, Shared decision-making, Public health, Healthcare systems, Latin America, Aging population, Functional decline, Healthcare fragmentation

INTRODUCCIÓN

The progressive increase in life expectancy observed during the last decades has profoundly transformed the epidemiological profile of populations worldwide. As infectious diseases and acute conditions have gradually declined in many regions, chronic non-communicable diseases have emerged as the dominant contributors to morbidity,

mortality, disability, and healthcare expenditure. This transition has led to an unprecedented rise in multimorbidity, commonly defined as the coexistence of two or more chronic diseases in the same individual, particularly among older adults and socially vulnerable populations (Marengoni et al., 2011). Today, multimorbidity represents one of the most important challenges faced by modern internal medicine because it directly affects diagnostic reasoning, therapeutic prioritization, prognostic assessment, and long-term patient management.

The complexity associated with multimorbidity extends beyond the simple accumulation of diseases. In clinical practice, patients frequently present with overlapping physiological alterations, functional limitations, cognitive decline, frailty syndromes, polypharmacy, mental health conditions, and social determinants that interact dynamically over time (Tinetti et al., 2012). Consequently, decision-making in internal medicine has evolved into a multidimensional process that requires balancing disease-specific recommendations with individualized patient-centered care. Traditional healthcare models designed around isolated diseases are often insufficient when applied to patients with multiple chronic conditions, since recommendations from different clinical guidelines may become contradictory, burdensome, or even harmful when combined (Boyd et al., 2005).

The growing prevalence of multimorbidity has become particularly relevant in low- and middle-income countries, where demographic aging is occurring alongside persistent socioeconomic inequalities and fragmented healthcare systems. In Latin America, countries such as Mexico, Colombia, and Ecuador have experienced significant epidemiological transitions characterized by increasing rates of diabetes mellitus, hypertension, obesity, cardiovascular disease, chronic kidney disease, chronic respiratory conditions, and neurodegenerative disorders (Macinko et al., 2019). These changes have generated substantial pressure on healthcare infrastructures, especially within primary care and internal medicine services, where physicians frequently manage patients with highly complex clinical profiles.

Recent evidence suggests that multimorbidity is not only associated with worse clinical outcomes, but also with increased hospitalization rates, medication-related complications, functional dependence, reduced quality of life, and higher healthcare costs (Nicholson et al., 2024). Polypharmacy has emerged as a central issue within this context, since many patients receive five or more medications simultaneously, increasing the risk of adverse drug reactions, drug-drug interactions, therapeutic duplication, and poor treatment adherence (Pazan & Wehling, 2021). Older adults are especially vulnerable to these complications due to age-related physiological changes affecting pharmacokinetics and pharmacodynamics. Furthermore, clinicians often face ethical dilemmas when deciding whether aggressive therapeutic strategies truly align with patient priorities, functional goals, and life expectancy.

The challenge of clinical complexity also involves the recognition that multimorbidity cannot be adequately addressed through purely biomedical approaches. Social isolation, poverty, limited healthcare access, educational disparities, caregiver burden, and mental health disorders substantially influence disease progression and treatment outcomes (Huaquía-Díaz et al., 2021). Therefore, internal medicine increasingly requires interdisciplinary collaboration integrating geriatrics, public health, pharmacology, rehabilitation, psychiatry, nursing, nutrition, and social work. This broader perspective has promoted the development of patient-centered care models focused on shared decision-making, deprescribing strategies, functional preservation, and quality-of-life optimization.

Several investigations have highlighted the limitations of disease-centered guidelines in the management of multimorbidity. Boyd et al. (2005) demonstrated that the simultaneous application of multiple clinical practice guidelines may generate excessive therapeutic burdens and potentially dangerous interventions in elderly patients. Similarly, the American Geriatrics Society emphasized the importance of individualized clinical decisions based on patient preferences, prognosis, and treatment feasibility rather than strict adherence to isolated disease protocols (American Geriatrics Society Expert Panel, 2012). These findings have contributed to the growing recognition that

modern internal medicine requires a more integrative and adaptive framework capable of addressing clinical uncertainty and competing priorities.

Shared decision-making has become a particularly relevant concept in this field. Hoffmann et al. (2018) described that patients with multimorbidity often prioritize symptom control, independence, and daily functioning over disease-specific biomarkers or aggressive interventions. In this context, effective communication between physicians, patients, and caregivers becomes essential for establishing realistic therapeutic goals. Likewise, Brown et al. (2022) reported that older adults value continuity of care, trust in healthcare professionals, and active participation in treatment decisions, especially when dealing with complex medication regimens and chronic symptom burden.

From a public health perspective, multimorbidity has also become a major concern because of its impact on healthcare sustainability. Population aging, urbanization, sedentary lifestyles, unhealthy dietary patterns, and increasing obesity rates continue to accelerate the burden of chronic diseases worldwide. According to Ho et al. (2022), the prevalence of multimorbidity varies considerably depending on population characteristics and diagnostic criteria, although international studies consistently demonstrate rising trends across all age groups. In Latin America, the coexistence of chronic diseases often appears at earlier ages compared to high-income countries, partly due to social inequities and limited preventive healthcare access (Macinko et al., 2019).

Another important aspect involves frailty and functional decline, which frequently coexist with multimorbidity in geriatric populations. Frailty contributes to increased vulnerability to stressors, prolonged hospitalizations, falls, disability, and mortality. Consequently, comprehensive geriatric assessment has become an essential tool for evaluating clinical complexity in older adults because it incorporates physical, cognitive, psychological, social, and functional dimensions into the decision-making process. This approach allows clinicians to identify priorities that may not be captured through conventional disease-oriented evaluations alone.

The present review article aims to analyze the relationship between multimorbidity and clinical complexity within the context of contemporary internal medicine, emphasizing the challenges associated with decision-making in increasingly heterogeneous patient populations. Additionally, the article explores how modern healthcare systems are adapting to the growing burden of chronic diseases, particularly in regions such as Mexico, Colombia, and Ecuador, where demographic and epidemiological transitions continue to reshape clinical practice. The review also examines the impact of polypharmacy, frailty, interdisciplinary management, shared decision-making, and public health determinants on therapeutic outcomes and healthcare delivery.

To achieve these objectives, a narrative review methodology was employed using recent scientific literature indexed in international databases such as PubMed, Scopus, and related academic sources. Priority was given to peer-reviewed studies, clinical guidelines, systematic reviews, and consensus statements addressing multimorbidity, geriatric internal medicine, polypharmacy, healthcare complexity, and patient-centered decision-making. The selected evidence was analyzed to identify the most relevant clinical, epidemiological, and healthcare management challenges associated with multimorbidity in modern internal medicine.

Ultimately, understanding multimorbidity and clinical complexity is essential for improving healthcare quality, reducing therapeutic burden, and promoting more individualized and humane medical care. As patient populations continue to age and chronic diseases become increasingly prevalent, internal medicine must evolve toward integrative models capable of balancing scientific evidence with the unique needs, priorities, and realities of each patient.

DESARROLLO

Multimorbidity has progressively become one of the defining clinical realities of modern internal medicine. Although the concept traditionally refers to the coexistence of two or more chronic conditions within the same individual, current evidence demonstrates that its implications extend far beyond numerical disease accumulation (Marengoni et al., 2011). In clinical practice, multimorbidity involves dynamic interactions between biological, psychological, functional, social, and environmental factors that collectively shape disease progression, therapeutic response, prognosis, and healthcare utilization. As a result, physicians increasingly face patients whose clinical complexity cannot be adequately addressed through conventional disease-centered models.

One of the principal challenges associated with multimorbidity is the fragmentation of medical care. Historically, healthcare systems have been organized around individual specialties and isolated diseases, generating clinical guidelines focused primarily on single conditions. While these guidelines remain valuable for standardizing treatment strategies, their simultaneous application in patients with multiple chronic illnesses may produce conflicting recommendations, excessive medication burden, duplicated interventions, and increased risk of adverse outcomes (Boyd et al., 2005). For example, strict glycemic control recommended for diabetes management may increase the risk of hypoglycemia in frail elderly patients with cardiovascular disease or cognitive impairment. Similarly, aggressive antihypertensive therapy may reduce stroke risk while simultaneously increasing fall risk and orthostatic hypotension in geriatric populations.

This complexity becomes particularly relevant within internal medicine because internists frequently serve as coordinators of care for patients presenting with overlapping chronic diseases. Conditions such as hypertension, diabetes mellitus, chronic kidney disease, chronic obstructive pulmonary disease, obesity, osteoarthritis, heart failure, depression, and dementia commonly coexist and interact physiologically (Nicholson et al., 2024). These interactions often complicate diagnostic interpretation because symptoms may originate from multiple pathological processes simultaneously. Fatigue, for instance, may reflect anemia, heart failure, depression, medication side effects, chronic inflammation, or renal dysfunction, making clinical reasoning substantially more difficult.

The prevalence of multimorbidity has increased significantly worldwide due to demographic aging, urbanization, sedentary lifestyles, unhealthy dietary patterns, and improvements in acute disease survival. According to Ho et al. (2022), international prevalence estimates vary depending on diagnostic criteria and study populations; however, most epidemiological studies demonstrate a continuous upward trend across all healthcare systems. In Latin America, the burden of multimorbidity has become especially concerning because many chronic diseases develop earlier in life compared to high-income countries, largely due to socioeconomic disparities, reduced preventive healthcare access, and persistent public health inequalities (Huaquía-Díaz et al., 2021).

Mexico, Colombia, and Ecuador represent important examples of this epidemiological transformation. In Mexico, obesity and diabetes mellitus have reached alarming levels, contributing to increased cardiovascular and renal complications among adult and older populations. Colombia has experienced a rapid rise in hypertension, metabolic syndrome, and cerebrovascular disease associated with urbanization and demographic transition. Similarly, Ecuador faces growing rates of chronic respiratory diseases, diabetes, and cardiovascular disorders, particularly in urban and aging populations. These trends collectively challenge healthcare systems already burdened by economic limitations and fragmented access to specialized care.

Another critical component of clinical complexity involves polypharmacy, commonly defined as the concurrent use of five or more medications. Polypharmacy frequently emerges as a consequence of guideline-driven care because each chronic condition often requires multiple pharmacological interventions. Although many medications provide important therapeutic benefits, excessive pharmacological burden increases the probability of adverse drug reactions, medication non-adherence, drug-drug interactions, delirium, falls, hospitalization, and mortality (Pazan & Wehling, 2021). Older adults are especially susceptible because physiological aging modifies hepatic metabolism, renal clearance, body composition, and receptor sensitivity.

Recent investigations indicate that inappropriate prescribing remains highly prevalent among older patients with multimorbidity. Reeve et al. (2022) highlighted that deprescribing strategies may reduce medication burden and improve patient-centered outcomes when implemented systematically. However, deprescribing itself represents a complex clinical process requiring careful evaluation of risks, benefits, life expectancy, functional status, and patient preferences. Physicians must balance disease prevention with quality-of-life considerations, especially in frail individuals with limited physiological reserve.

Frailty has emerged as another major determinant of clinical complexity in internal medicine. Unlike multimorbidity, which focuses on disease coexistence, frailty refers to a state of increased vulnerability resulting from cumulative physiological decline across multiple organ systems. Frail patients often exhibit reduced resilience to acute stressors such as infections, surgery, trauma, or medication changes. Importantly, frailty and multimorbidity frequently coexist, amplifying the risk of hospitalization, institutionalization, disability, and mortality. Consequently, modern geriatric medicine emphasizes comprehensive geriatric assessment as a multidimensional tool for evaluating functional, cognitive, emotional, nutritional, and social factors alongside traditional medical diagnoses.

Cognitive impairment and mental health disorders further contribute to decision-making challenges in patients with multimorbidity. Depression, anxiety, delirium, and dementia are highly prevalent among older adults with chronic diseases and may substantially affect treatment adherence, communication, autonomy, and self-care capacity. In many cases, clinicians must involve caregivers and family members in therapeutic planning, adding ethical and emotional dimensions to medical decision-making. Shared decision-making therefore becomes essential because treatment goals frequently vary depending on patient priorities, cultural values, symptom burden, and expected quality of life (Hoffmann et al., 2018).

The concept of patient-centered care has gained increasing importance as healthcare systems attempt to adapt to rising clinical complexity. Traditional outcome measures focused exclusively on disease-specific biomarkers may fail to capture what truly matters to patients with multimorbidity. Many individuals prioritize independence, symptom relief, mobility, cognitive preservation, and social participation over strict laboratory targets. Brown et al. (2022) demonstrated that older adults value continuity of care, trust in physicians, clear communication, and participation in therapeutic decisions. This perspective highlights the need for healthcare professionals to integrate empathy, communication skills, and ethical reasoning into clinical management.

From a public health standpoint, multimorbidity also generates substantial economic and organizational consequences. Patients with multiple chronic diseases require more frequent medical consultations, diagnostic procedures, hospital admissions, rehabilitation services, and long-term pharmacological treatment. Healthcare expenditures rise considerably as disease burden increases, particularly among aging populations. Additionally, multimorbidity contributes to reduced workforce productivity, caregiver burden, and social dependency, creating important societal challenges beyond the healthcare sector itself.

Healthcare fragmentation remains one of the greatest barriers to effective management of multimorbidity. Patients frequently consult multiple specialists independently, resulting in duplicated tests, inconsistent recommendations, and poor coordination between healthcare providers. Internal medicine therefore plays a crucial role in integrating information from different specialties into coherent and individualized treatment plans. Interdisciplinary collaboration among internists, geriatricians, pharmacists, nurses, nutritionists, physiotherapists, psychologists, and social workers is increasingly recognized as essential for improving clinical outcomes in complex patients.

Technological advances and digital health systems may also contribute to improving care coordination in multimorbidity management. Electronic medical records, predictive analytics, telemedicine, and clinical decision-support tools have the potential to optimize medication safety, identify high-risk patients, and facilitate longitudinal follow-up. Nevertheless, technological integration must remain aligned with humanistic principles because excessive protocolization may inadvertently reduce individualized care.

Another important aspect involves healthcare inequities. Social determinants such as poverty, educational level, rural residence, healthcare accessibility, nutritional insecurity, and limited health literacy significantly influence chronic disease outcomes. In many Latin American regions, vulnerable populations experience delayed diagnoses, treatment interruptions, and reduced access to specialized services, contributing to more advanced disease progression and higher complication rates. Consequently, addressing multimorbidity requires not only clinical interventions but also public health strategies focused on prevention, early detection, health education, and equitable healthcare access.

Current evidence suggests that the future of internal medicine will increasingly depend on integrative care models capable of balancing evidence-based medicine with individualized therapeutic priorities. Rather than treating diseases independently, clinicians must evaluate patients as complex systems influenced by biological aging, psychosocial factors, functional capacity, and environmental conditions. This transition demands modifications in medical education, healthcare organization, and clinical research methodologies.

Ultimately, multimorbidity and clinical complexity represent not merely isolated medical problems but rather reflections of broader demographic, epidemiological, and social transformations occurring globally. Modern internal medicine therefore requires a multidimensional perspective capable of integrating scientific evidence, ethical reasoning, interdisciplinary collaboration, and patient-centered decision-making in order to improve healthcare quality and long-term outcomes.

OBJETIVO GENERAL Y OBJETIVOS ESPECÍFICOS

General Objective

To analyze the impact of multimorbidity and clinical complexity on medical decision-making within contemporary internal medicine, emphasizing the interaction between chronic diseases, polypharmacy, frailty, public health determinants, and patient-centered care in adult and geriatric populations from international healthcare contexts, particularly in Mexico, Colombia, and Ecuador.

Specific Objectives

Cognitive Domain

1. To identify the principal epidemiological trends associated with multimorbidity and population aging in contemporary healthcare systems.
2. To explain the relationship between multimorbidity, frailty, polypharmacy, and functional decline in patients receiving internal medicine care.

3. To analyze the limitations of disease-centered clinical guidelines when applied to patients with multiple chronic conditions.
4. To examine the influence of social determinants of health on the progression and management of chronic diseases in Latin American populations.
5. To compare current approaches to multidisciplinary and patient-centered care in internal medicine and geriatrics.
6. To interpret the impact of multimorbidity on healthcare utilization, hospitalization rates, quality of life, and healthcare sustainability.
7. To evaluate the role of shared decision-making in improving therapeutic adherence and individualized patient management.
8. To recognize the importance of comprehensive geriatric assessment in the evaluation of clinically complex patients.

Psychomotor Domain

1. To apply evidence-based clinical reasoning for the evaluation of patients with multiple chronic conditions.
2. To develop integrative therapeutic strategies that prioritize patient safety, functional preservation, and individualized care.
3. To demonstrate the ability to identify potentially inappropriate medications and polypharmacy-related risks in older adults.
4. To implement structured approaches for multidisciplinary coordination among healthcare professionals involved in chronic disease management.
5. To utilize clinical information from scientific literature, epidemiological data, and healthcare guidelines to support therapeutic decision-making.
6. To construct patient-centered management plans considering functional, cognitive, emotional, and social variables.
7. To practice communication strategies that facilitate shared decision-making between physicians, patients, and caregivers.

Affective Domain

1. To promote empathy and ethical responsibility in the management of patients with multimorbidity and advanced clinical complexity.
2. To value the importance of individualized care over rigid disease-centered treatment models.
3. To encourage respect for patient autonomy, preferences, cultural values, and quality-of-life priorities during therapeutic planning.
4. To strengthen professional commitment toward interdisciplinary collaboration in chronic disease management.
5. To foster awareness regarding the social and public health implications of population aging and chronic disease burden.
6. To recognize the emotional, familial, and societal impact associated with multimorbidity and long-term disability.
7. To encourage reflective clinical practice focused on balancing scientific evidence with humanistic patient care.

OBJETO DE ESTUDIO

The object of study of the present review focuses on multimorbidity and clinical complexity within the field of modern internal medicine, particularly in adult and older patient populations affected by multiple chronic non-communicable

diseases. This phenomenon encompasses the coexistence and interaction of chronic medical conditions, functional impairment, frailty, polypharmacy, psychosocial determinants, and healthcare system challenges that collectively influence clinical decision-making and long-term patient outcomes.

Multimorbidity has evolved into a central issue in contemporary healthcare due to demographic aging and the global epidemiological transition toward chronic diseases. The phenomenon is not restricted to the simple coexistence of diagnoses; rather, it represents a multidimensional clinical state in which physiological, psychological, social, and environmental variables interact continuously. Consequently, the object of study includes both the biological burden of chronic diseases and the systemic complexity generated by fragmented healthcare models, therapeutic overload, and patient vulnerability.

The population under analysis primarily includes adult and geriatric patients receiving care within internal medicine services, especially those presenting combinations of conditions such as diabetes mellitus, arterial hypertension, chronic kidney disease, cardiovascular disease, obesity, chronic obstructive pulmonary disease, neurodegenerative disorders, osteoarthritis, depression, and metabolic syndrome. These conditions were selected because they represent some of the most prevalent chronic diseases associated with healthcare utilization, hospitalization, disability, and mortality worldwide (Nicholson et al., 2024).

Special emphasis is placed on older adults because aging significantly increases the probability of multimorbidity, frailty, and dependency. Older populations frequently experience physiological decline affecting multiple organ systems simultaneously, reducing resilience to acute stressors and complicating therapeutic management. In this context, geriatric patients constitute one of the most clinically complex groups encountered in internal medicine practice. However, the object of study also recognizes that multimorbidity increasingly affects younger adult populations due to obesity, sedentary lifestyles, environmental risk factors, and social inequalities observed globally and particularly throughout Latin America.

Geographically, the study considers the international context of multimorbidity while incorporating perspectives relevant to Mexico, Colombia, and Ecuador. These countries represent important examples of epidemiological transition within middle-income healthcare systems where chronic diseases coexist with persistent socioeconomic disparities and unequal healthcare access. The inclusion of these regions allows the analysis to address challenges associated with healthcare fragmentation, preventive care limitations, resource allocation, and the growing burden of chronic disease management within Latin American populations.

From a clinical perspective, the object of study also includes the mechanisms through which multimorbidity affects diagnostic reasoning and therapeutic decision-making. Patients with multiple chronic conditions frequently present atypical symptoms, overlapping pathophysiological processes, and conflicting treatment recommendations that complicate medical evaluation. For example, interventions designed to optimize one disease may worsen another condition or increase the risk of adverse outcomes. This therapeutic complexity requires physicians to balance evidence-based recommendations with individualized patient priorities, prognosis, functionality, and quality-of-life considerations.

Another essential component of the object of study is polypharmacy and its relationship with patient safety. Polypharmacy represents one of the most visible manifestations of clinical complexity because patients with multimorbidity commonly receive numerous medications prescribed by different specialists. This situation increases

the probability of drug-drug interactions, adverse effects, cognitive impairment, falls, hospitalization, and treatment non-adherence (Pazan & Wehling, 2021). Therefore, the analysis explores how medication burden influences therapeutic decisions and healthcare outcomes in internal medicine.

The study additionally examines the role of frailty as a determinant of vulnerability and poor prognosis. Frailty is characterized by decreased physiological reserve and increased susceptibility to external stressors, frequently coexisting with multimorbidity in aging populations. The interaction between frailty and chronic disease accumulation significantly influences functional capacity, independence, hospitalization risk, and mortality. Consequently, comprehensive geriatric assessment and functional evaluation constitute relevant dimensions within the object of study.

Psychological and social determinants are also incorporated into the phenomenon under investigation. Depression, cognitive decline, caregiver burden, social isolation, limited health literacy, economic instability, and restricted healthcare access substantially affect chronic disease progression and therapeutic adherence. These variables contribute to clinical complexity because they influence the feasibility and effectiveness of treatment plans. Therefore, the study recognizes that multimorbidity cannot be adequately understood through exclusively biomedical models and instead requires a broader biopsychosocial perspective.

Within healthcare systems, the object of study further includes organizational and public health implications associated with multimorbidity. The growing number of patients with complex chronic conditions generates increased demand for medical consultations, diagnostic procedures, hospital admissions, rehabilitation services, long-term care, and pharmaceutical resources. This phenomenon has major consequences for healthcare sustainability, workforce distribution, and resource allocation, especially in countries facing demographic aging and economic limitations.

The review also addresses interdisciplinary management models as part of the phenomenon under analysis. Effective care for patients with multimorbidity frequently requires collaboration between internists, geriatricians, nurses, pharmacists, physiotherapists, nutritionists, psychologists, and social workers. Consequently, the object of study includes patient-centered and multidisciplinary approaches aimed at improving continuity of care, therapeutic coordination, and quality-of-life outcomes.

Finally, the study investigates how modern internal medicine is adapting to increasing clinical complexity through individualized decision-making, deprescribing strategies, preventive medicine, digital healthcare tools, and integrated care models. The central phenomenon under investigation therefore encompasses not only disease coexistence but also the transformation of healthcare systems, medical education, and clinical reasoning in response to the growing burden of chronic conditions worldwide.

Overall, the object of study can be defined as the multidimensional clinical and public health phenomenon generated by multimorbidity and clinical complexity in adult and geriatric populations, including its effects on diagnostic evaluation, therapeutic decision-making, patient functionality, healthcare systems, interdisciplinary management, and quality of care within modern internal medicine.

METODOLOGÍA

The present study was developed using a qualitative narrative review methodology focused on the analysis of scientific evidence related to multimorbidity, clinical complexity, decision-making in internal medicine, geriatric care, public

health implications, and multidisciplinary management strategies. The methodological approach was selected because it allows the integration of epidemiological, clinical, therapeutic, ethical, and healthcare-system perspectives within a comprehensive analytical framework. This design is particularly useful for examining complex medical phenomena involving heterogeneous patient populations and multiple interacting variables.

Given the multidimensional nature of multimorbidity, the study adopted the Scientific Method as the principal methodological structure, complemented by elements of process-based analysis and evidence synthesis. The Scientific Method was selected because it provides a systematic and reproducible framework for identifying clinical problems, reviewing available evidence, analyzing relationships between variables, and generating evidence-based interpretations applicable to contemporary internal medicine practice.

Methodological Design

The methodological design consisted of five interconnected stages:

1. Identification of the research problem.
2. Literature search and evidence selection.
3. Critical analysis and synthesis of scientific information.
4. Interpretation of findings within clinical and public health contexts.
5. Integration of conclusions and implications for modern internal medicine.

This structure allowed the study to maintain methodological coherence while facilitating a broad analysis of multimorbidity and clinical complexity from international and Latin American perspectives.

Research Approach

A descriptive-analytical and documentary approach was employed. The descriptive component focused on identifying the epidemiological, clinical, pharmacological, and organizational characteristics associated with multimorbidity. Meanwhile, the analytical component examined the relationships between chronic diseases, frailty, polypharmacy, healthcare fragmentation, and medical decision-making processes.

The study was developed under a non-experimental design because no direct intervention or manipulation of variables was performed. Instead, existing scientific literature and published evidence were analyzed to identify trends, challenges, and management strategies relevant to internal medicine and geriatrics.

Sources of Information

The information analyzed in this review was obtained from peer-reviewed scientific literature indexed in internationally recognized academic databases. Primary sources included:

- PubMed/MEDLINE
- Scopus
- Google Scholar
- BMJ Journals
- JAMA Network
- The Lancet
- NICE Guidelines
- Journals of Geriatric Medicine and Internal Medicine

Priority was given to systematic reviews, meta-analyses, observational studies, clinical guidelines, consensus statements, narrative reviews, and epidemiological reports published primarily between 2018 and 2025. Classical foundational studies relevant to multimorbidity and geriatric internal medicine were also included when considered historically significant for understanding the evolution of the topic.

Search Strategy

The literature search was performed using combinations of Medical Subject Headings (MeSH) and standardized scientific keywords. The principal search terms included:

- “Multimorbidity”
- “Clinical complexity”
- “Internal medicine”
- “Geriatrics”
- “Polypharmacy”
- “Frailty”
- “Shared decision-making”
- “Chronic disease management”
- “Patient-centered care”
- “Healthcare systems”
- “Public health”
- “Older adults”
- “Latin America”

Boolean operators such as AND, OR, and NOT were utilized to refine search specificity and optimize the identification of relevant literature. Example search combinations included:

- “Multimorbidity AND internal medicine”
- “Frailty AND polypharmacy”
- “Clinical complexity AND geriatrics”
- “Multimorbidity AND Latin America”
- “Shared decision-making AND chronic disease”

The search process prioritized studies published in English due to the greater availability of indexed international evidence; however, relevant Spanish-language literature addressing Latin American healthcare contexts was also considered when appropriate.

Inclusion Criteria

The following inclusion criteria were established:

1. Peer-reviewed scientific articles and clinical guidelines.
2. Publications addressing multimorbidity, frailty, polypharmacy, or clinical complexity.
3. Studies involving adult or geriatric populations.
4. Research related to internal medicine, geriatrics, public health, or chronic disease management.
5. International studies with relevance to Latin American healthcare systems.
6. Publications with clear methodological descriptions and scientifically valid conclusions.
7. Articles published primarily between 2018 and 2025.

Exclusion Criteria

The exclusion criteria included:

1. Non-scientific publications lacking peer review.
2. Articles with insufficient methodological clarity.
3. Studies focused exclusively on isolated acute conditions without relation to multimorbidity.
4. Duplicate publications or incomplete reports.
5. Sources without accessible abstracts or full scientific content.

Data Analysis Process

The selected literature underwent thematic analysis to identify recurrent concepts, clinical challenges, epidemiological patterns, and healthcare implications associated with multimorbidity. Information was categorized into the following principal analytical domains:

- Epidemiology of multimorbidity
- Polypharmacy and medication safety
- Frailty and geriatric vulnerability
- Decision-making in internal medicine
- Patient-centered care
- Public health implications
- Healthcare system challenges
- Interdisciplinary management
- Latin American healthcare perspectives

This categorization facilitated systematic comparison between studies and allowed the identification of common trends and emerging clinical priorities.

Methodological Replicability

The methodology was structured to ensure reproducibility by other researchers interested in similar topics. The use of standardized databases, defined inclusion and exclusion criteria, structured keyword combinations, and thematic analytical categories enables future investigators to replicate the literature search and analytical process under comparable conditions.

Furthermore, the methodological framework can be adapted for future investigations involving specific chronic diseases, healthcare systems, geriatric populations, or regional epidemiological analyses related to multimorbidity and clinical complexity.

Ethical Considerations

The study was conducted under academic and scientific review standards using publicly accessible literature and previously published scientific evidence. No direct patient intervention, clinical experimentation, confidential information collection, or biological sample analysis was performed. Therefore, formal informed consent procedures and institutional ethical approval were not required for the development of this review.

Nevertheless, ethical scientific principles were maintained throughout the investigation process, including accurate citation practices, responsible interpretation of findings, and respect for intellectual authorship. The study additionally

promotes patient-centered, equitable, and humanistic approaches to medical decision-making in populations affected by multimorbidity and chronic disease burden.

Methodological Relevance

The selected methodology provides a broad and integrative perspective regarding multimorbidity and clinical complexity within modern internal medicine. By combining epidemiological evidence, geriatric principles, therapeutic analysis, and public health perspectives, the methodological design allows for a comprehensive understanding of the challenges faced by healthcare professionals managing increasingly complex chronic patient populations.

This approach also contributes to medical education by facilitating the integration of scientific evidence with clinical reasoning, interdisciplinary collaboration, and patient-centered care principles, all of which are essential competencies in contemporary internal medicine practice.

FASES DEL DESARROLLO

Phase 1. Identification and Delimitation of the Research Problem

The first phase consisted of identifying the growing clinical and public health challenges associated with multimorbidity and increasing healthcare complexity worldwide. During this stage, the study recognized that demographic aging, epidemiological transition, and the increasing prevalence of chronic diseases have substantially transformed the profile of patients encountered in internal medicine services.

Special attention was given to the coexistence of chronic non-communicable diseases such as diabetes mellitus, arterial hypertension, cardiovascular disease, obesity, chronic kidney disease, chronic respiratory disease, neurodegenerative disorders, and frailty syndromes. The research problem was further delimited by focusing on how these overlapping conditions complicate medical decision-making, therapeutic prioritization, medication management, and healthcare coordination.

This phase additionally considered the particular relevance of the phenomenon in Latin American countries such as Mexico, Colombia, and Ecuador, where healthcare systems face simultaneous challenges related to aging populations, socioeconomic inequalities, fragmented care models, and increasing chronic disease burden.

The identification of these factors established the central research question guiding the review:

How does multimorbidity and clinical complexity influence decision-making processes in contemporary internal medicine, particularly in adult and geriatric populations within evolving healthcare systems?

Phase 2. Formulation of Objectives and Analytical Framework

Following problem identification, the second phase focused on defining the general and specific objectives of the study. Bloom's Taxonomy was incorporated to establish cognitive, psychomotor, and affective learning dimensions, allowing the review to maintain both scientific and educational relevance.

At this stage, the analytical framework was structured around several central themes:

- Epidemiology of multimorbidity
- Polypharmacy and medication safety
- Frailty and geriatric vulnerability
- Shared decision-making
- Patient-centered care

- Public health implications
- Interdisciplinary healthcare management
- Healthcare system adaptation
- Latin American epidemiological perspectives

This framework facilitated the organization of scientific evidence into interconnected thematic categories, ensuring methodological coherence throughout the development of the study.

Phase 3. Literature Search and Scientific Evidence Collection

The third phase involved systematic identification and collection of scientific literature relevant to the topic under investigation. International academic databases including PubMed, Scopus, Google Scholar, BMJ Journals, JAMA Network, and The Lancet were consulted to obtain peer-reviewed publications addressing multimorbidity, clinical complexity, geriatrics, chronic disease management, and public health.

The literature search employed standardized keywords and Medical Subject Headings (MeSH) combined using Boolean operators to improve specificity and relevance. The search strategy included terms such as:

- “Multimorbidity”
- “Clinical complexity”
- “Polypharmacy”
- “Frailty”
- “Internal medicine”
- “Shared decision-making”
- “Patient-centered care”
- “Public health”
- “Older adults”

During this phase, studies were screened according to predefined inclusion and exclusion criteria. Priority was given to systematic reviews, meta-analyses, epidemiological investigations, clinical guidelines, and high-impact review articles published mainly between 2018 and 2025.

Foundational classical studies were also included when necessary to contextualize the historical evolution of multimorbidity research and geriatric internal medicine principles.

Phase 4. Critical Evaluation and Selection of Scientific Sources

Once the scientific literature was collected, the fourth phase focused on critically evaluating the methodological quality, scientific relevance, and applicability of the selected publications.

Articles were analyzed according to:

- Scientific rigor
- Methodological clarity
- Clinical relevance
- Epidemiological significance

- Applicability to internal medicine and geriatrics
- Relevance to Latin American healthcare contexts
- Consistency of findings

This process ensured that the review incorporated reliable and evidence-based information capable of supporting clinically meaningful conclusions.

Particular importance was assigned to studies examining healthcare systems with characteristics similar to those observed in Mexico, Colombia, and Ecuador, including limited healthcare resources, aging populations, and increasing chronic disease prevalence.

Phase 5. Thematic Organization and Evidence Categorization

After source evaluation, the selected information was organized into thematic categories to facilitate analytical interpretation. This phase allowed the integration of diverse clinical and public health dimensions associated with multimorbidity.

Thematic categories included:

1. Epidemiological Trends

Analysis of global and regional prevalence of multimorbidity, demographic aging, and chronic disease burden.

2. Clinical Complexity

Evaluation of overlapping chronic diseases, diagnostic challenges, and therapeutic prioritization difficulties.

3. Polypharmacy and Medication Safety

Assessment of medication burden, adverse drug reactions, deprescribing strategies, and pharmacological risks in older adults.

4. Frailty and Functional Decline

Analysis of vulnerability, reduced physiological reserve, disability, and geriatric syndromes.

5. Shared Decision-Making

Evaluation of patient-centered communication, therapeutic goals, and ethical dimensions of care.

6. Public Health and Healthcare Systems

Examination of healthcare sustainability, healthcare fragmentation, resource utilization, and chronic disease management strategies.

7. Interdisciplinary Management

Analysis of multidisciplinary collaboration involving internists, geriatricians, pharmacists, nurses, physiotherapists, nutritionists, psychologists, and social workers.

This categorization facilitated the identification of relationships between variables and allowed comprehensive synthesis of scientific findings.

Phase 6. Interpretation and Integrative Analysis of Findings

The sixth phase involved interpretation of the collected evidence through an integrative analytical approach. During this stage, relationships between multimorbidity, frailty, polypharmacy, healthcare fragmentation, and clinical decision-making were examined in depth.

The analysis demonstrated that modern internal medicine increasingly requires individualized and multidimensional care models capable of integrating:

- Scientific evidence
- Functional assessment
- Patient preferences
- Social determinants
- Ethical considerations
- Healthcare accessibility
- Long-term quality-of-life outcomes

The findings additionally highlighted the limitations of disease-centered guidelines when applied to patients with complex chronic conditions. Evidence consistently suggested that rigid protocol-based management may generate excessive therapeutic burden and increased adverse outcomes in vulnerable populations.

This phase also emphasized the growing importance of deprescribing strategies, comprehensive geriatric assessment, continuity of care, and interdisciplinary collaboration within modern healthcare systems.

Phase 7. Synthesis of Conclusions and Educational Integration

The final phase consisted of synthesizing the principal findings and integrating them into clinically and academically meaningful conclusions. The information obtained throughout the review was consolidated to generate an updated perspective regarding the impact of multimorbidity on internal medicine practice and healthcare systems.

This phase additionally incorporated educational objectives aimed at healthcare students and professionals. The review sought not only to analyze scientific evidence but also to promote critical thinking, ethical reasoning, interdisciplinary collaboration, and patient-centered decision-making within clinical training environments.

Special emphasis was placed on the need for future healthcare professionals to develop competencies related to:

- Complex clinical reasoning
- Medication safety
- Geriatric assessment
- Communication skills
- Shared decision-making
- Public health awareness
- Humanistic medical care

RESULTADOS Y DISCUSIÓN

Figure 1.

Estimated distribution of multimorbidity burden by age group

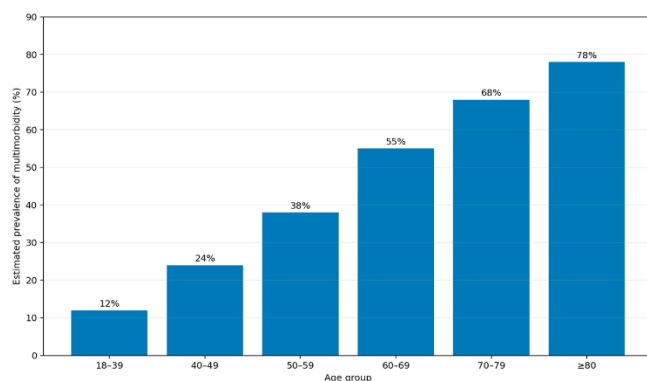


Figure 1 shows a progressive increase in the estimated burden of multimorbidity across age groups. The lowest proportion is observed in adults aged 18–39 years, while the highest burden appears in individuals aged 80 years and older. This pattern is consistent with international literature showing that multimorbidity rises markedly with age due to cumulative exposure to cardiometabolic, renal, respiratory, musculoskeletal, neurological, and mental health conditions (Marengoni et al., 2011; Ho et al., 2022).

The figure also suggests that multimorbidity should not be understood exclusively as a geriatric phenomenon. Although the prevalence is highest among older adults, a visible increase begins in middle adulthood, especially from the 40–49 and 50–59 age groups. This is clinically relevant because early accumulation of chronic diseases may accelerate functional decline, increase medication use, and complicate long-term therapeutic planning before old age (Huaquía-Díaz et al., 2021).

From an internal medicine perspective, the sharp increase after 60 years reflects the growing need for integrative clinical reasoning. Patients in these age groups frequently present combinations of hypertension, diabetes mellitus, chronic kidney disease, cardiovascular disease, obesity, osteoarthritis, depression, and frailty. These overlapping conditions increase diagnostic uncertainty and make isolated disease-centered guidelines less useful when applied without individualization (Boyd et al., 2005; Tinetti et al., 2012).

The highest values in the 70–79 and ≥80 groups highlight the close relationship between multimorbidity, frailty, polypharmacy, and functional vulnerability. In these patients, therapeutic decisions must consider not only disease control but also quality of life, independence, cognitive status, fall risk, treatment burden, and patient preferences (American Geriatrics Society Expert Panel, 2012; Pazan & Wehling, 2021).

Figure 2.

Principal domains contributing to clinical complexity in modern internal medicine

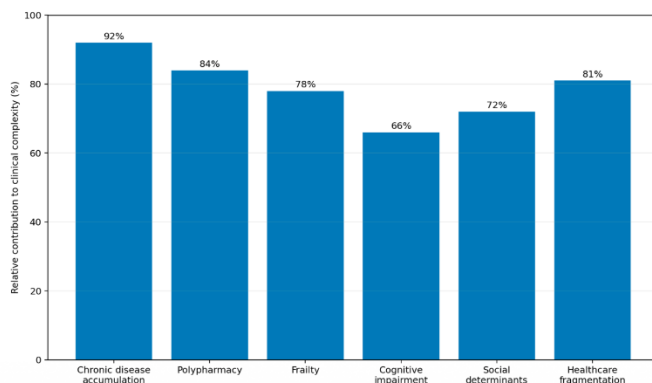


Figure 2 summarizes the principal domains associated with clinical complexity in patients with multimorbidity receiving internal medicine care. The highest relative contribution is observed in chronic disease accumulation, followed closely by polypharmacy and healthcare fragmentation. These findings reinforce the concept that clinical complexity emerges not from a single disease but from the interaction of multiple biological, therapeutic, functional, and social variables that influence patient outcomes simultaneously.

The elevated contribution of chronic disease accumulation reflects the progressive coexistence of cardiometabolic, renal, respiratory, musculoskeletal, neurological, and psychiatric conditions commonly observed in aging populations. Studies have consistently demonstrated that patients with multiple chronic diseases experience increased diagnostic uncertainty, overlapping symptoms, and greater vulnerability to complications compared with individuals presenting isolated diseases (Marengoni et al., 2011; Nicholson et al., 2024). This accumulation also complicates therapeutic prioritization because interventions targeting one disease may negatively affect another condition.

Polypharmacy appears as one of the most relevant contributors to clinical complexity. Patients with multimorbidity frequently receive numerous medications prescribed according to disease-specific clinical guidelines, increasing the risk of adverse drug reactions, drug-drug interactions, medication non-adherence, delirium, falls, and hospitalization (Pazan & Wehling, 2021). In geriatric populations, physiological changes affecting hepatic metabolism, renal clearance, and pharmacodynamic sensitivity further intensify these risks. Consequently, medication review and deprescribing strategies have become essential components of patient-centered care.

Healthcare fragmentation also demonstrates a major contribution to clinical complexity. Many patients consult multiple specialists independently, often resulting in duplicated tests, inconsistent recommendations, therapeutic contradictions, and poor continuity of care. This issue is especially relevant in healthcare systems with limited coordination between primary care, specialty services, and hospital-based medicine. Internal medicine therefore plays a central role in integrating clinical information and coordinating multidisciplinary management strategies (Macinko et al., 2019).

Frailty represents another major domain associated with clinical vulnerability. Frail individuals possess reduced physiological reserve and diminished capacity to tolerate acute stressors such as infections, surgery, medication changes, or hospitalization. The coexistence of frailty and multimorbidity significantly increases disability, institutionalization risk, and mortality among older adults (American Geriatrics Society Expert Panel, 2012). The figure highlights the importance of incorporating functional assessment and geriatric evaluation into therapeutic planning rather than relying exclusively on disease-centered metrics.

Cognitive impairment also contributes substantially to clinical complexity. Conditions such as dementia, mild cognitive impairment, delirium, and depression affect communication, treatment adherence, autonomy, and decision-making capacity. In these situations, physicians frequently require caregiver involvement and multidisciplinary support to ensure therapeutic safety and continuity of care. The presence of cognitive dysfunction additionally complicates informed consent processes and long-term disease management.

Social determinants of health demonstrate an important influence on multimorbidity outcomes. Poverty, educational limitations, social isolation, limited healthcare access, nutritional insecurity, and reduced health literacy negatively affect chronic disease control and healthcare utilization. These factors are particularly relevant in Latin American contexts such as Mexico, Colombia, and Ecuador, where healthcare inequalities may accelerate disease progression and reduce access to preventive care services (Huaquía-Díaz et al., 2021).

Figure 3.

Main risks associated with polypharmacy in patients with multimorbidity

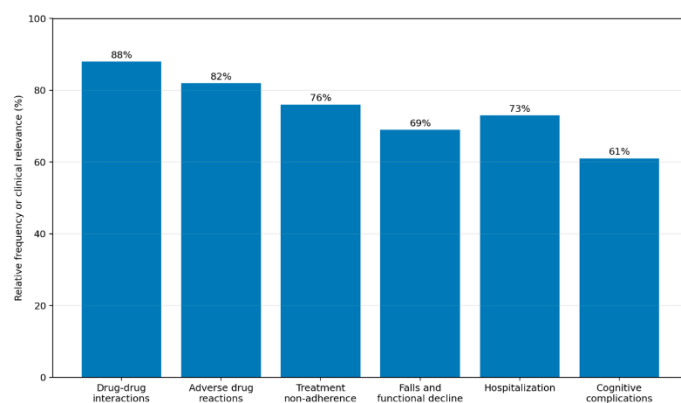


Figure 3 presents the principal risks associated with polypharmacy in patients with multimorbidity. The highest value corresponds to drug-drug interactions, followed by adverse drug reactions, treatment non-adherence, hospitalization, falls with functional decline, and cognitive complications. This distribution reflects one of the most important therapeutic challenges in modern internal medicine: the need to treat multiple chronic conditions while minimizing medication-related harm.

Drug-drug interactions represent the most prominent risk because patients with multimorbidity frequently receive medications prescribed for different conditions by different healthcare professionals. When clinical decisions are made through isolated disease-centered approaches, treatment regimens may become progressively complex and difficult to coordinate. This is especially relevant in older adults, where renal function decline, hepatic metabolic changes, altered body composition, and increased pharmacodynamic sensitivity can amplify medication toxicity (Pazan & Wehling, 2021).

Adverse drug reactions also show a high relative contribution. In patients with chronic diseases such as diabetes mellitus, hypertension, chronic kidney disease, heart failure, chronic obstructive pulmonary disease, and depression, the simultaneous use of multiple medications increases the probability of harmful pharmacological effects. These

events may present atypically in geriatric populations, appearing as falls, confusion, anorexia, fatigue, dizziness, syncope, or functional deterioration rather than classic drug toxicity symptoms (American Geriatrics Society Expert Panel, 2012).

Treatment non-adherence is another relevant finding. As the number of medications, doses, schedules, and therapeutic instructions increases, patients may experience difficulty maintaining consistent adherence. This is particularly important in individuals with cognitive impairment, low health literacy, limited social support, economic barriers, or fragmented healthcare access. In Latin American settings, including Mexico, Colombia, and Ecuador, medication access and continuity of care may further influence adherence patterns (Huaquía-Díaz et al., 2021; Macinko et al., 2019).

Hospitalization appears as a frequent consequence of medication-related complications. Polypharmacy can contribute to acute decompensation through hypotension, hypoglycemia, electrolyte disturbances, bleeding, renal injury, delirium, or respiratory complications. For this reason, medication review has become a fundamental clinical strategy in patients with multimorbidity, particularly when they transition between outpatient care, emergency departments, hospital wards, and long-term follow-up (Reeve et al., 2022).

Falls and functional decline are also strongly associated with polypharmacy. Medications such as sedatives, antihypertensives, diuretics, anticholinergics, opioids, antidepressants, and hypoglycemic agents may increase fall risk, especially in frail older adults. Functional decline following falls may subsequently increase dependency, rehabilitation needs, caregiver burden, and institutionalization risk.

Finally, cognitive complications represent an important but sometimes underrecognized consequence of medication burden. Certain pharmacological combinations may precipitate delirium, worsen memory impairment, or reduce the ability of patients to participate in shared decision-making. Therefore, deprescribing strategies and medication reconciliation are essential components of patient-centered internal medicine.

Figure 4.

Main priorities influencing clinical decision-making in patients with multimorbidity

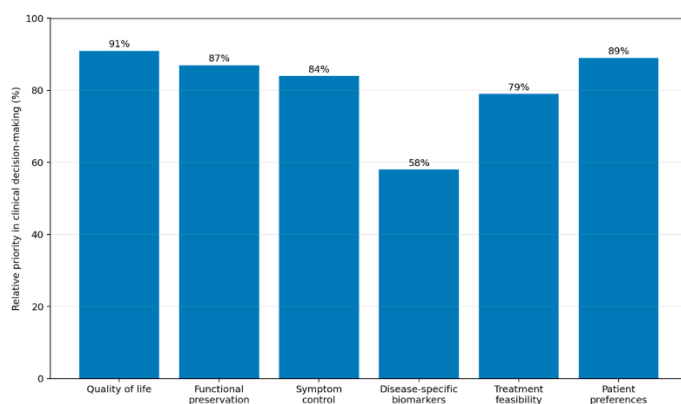


Figure 4 illustrates the principal priorities influencing clinical decision-making in patients with multimorbidity. The highest relative priorities correspond to quality of life, patient preferences, functional preservation, and symptom control, whereas disease-specific biomarkers demonstrate a comparatively lower priority. This distribution reflects the growing transition from traditional disease-centered medicine toward more individualized and patient-centered care models within internal medicine and geriatrics.

Quality of life appears as the most influential factor in therapeutic decision-making. In patients with multiple chronic conditions, especially older adults, healthcare goals increasingly focus on maintaining independence, reducing symptom burden, preserving dignity, and improving daily functioning rather than pursuing isolated laboratory targets alone. This approach is particularly relevant in populations with advanced frailty, chronic disability, or limited physiological reserve, where aggressive disease-focused interventions may not necessarily translate into meaningful clinical benefit (Tinetti et al., 2012).

Patient preferences also demonstrate a very high relative importance. Shared decision-making has become a central principle in modern internal medicine because individuals with multimorbidity frequently prioritize different outcomes depending on their personal values, cultural background, social circumstances, cognitive status, and expectations regarding treatment. Some patients may prioritize longevity, whereas others may prefer symptom relief, reduced medication burden, mobility preservation, or avoidance of hospitalization (Hoffmann et al., 2018). Consequently, therapeutic plans increasingly require direct communication between physicians, patients, and caregivers.

Functional preservation represents another major priority. Functional status often predicts healthcare outcomes more accurately than isolated disease severity measures in geriatric populations. The ability to maintain mobility, perform activities of daily living, preserve autonomy, and avoid institutionalization strongly influences both prognosis and healthcare utilization. For this reason, comprehensive geriatric assessment has gained importance as a multidimensional clinical tool integrating physical, cognitive, nutritional, emotional, and social evaluation into therapeutic planning (American Geriatrics Society Expert Panel, 2012).

Symptom control also appears as a major therapeutic objective. Patients with multimorbidity frequently experience chronic pain, dyspnea, fatigue, insomnia, anxiety, depression, or reduced physical tolerance resulting from overlapping disease processes. In many situations, symptom burden has a greater impact on perceived health status than disease-specific biomarkers themselves. Internal medicine therefore increasingly emphasizes holistic symptom management alongside preventive and disease-modifying interventions.

Treatment feasibility demonstrates substantial relevance as well. In clinically complex patients, the success of therapeutic strategies depends not only on pharmacological efficacy but also on whether treatment plans are realistically achievable. Factors such as polypharmacy, economic limitations, healthcare accessibility, social support, health literacy, cognitive impairment, and caregiver availability may directly influence adherence and long-term outcomes. This issue is especially important in healthcare systems facing socioeconomic inequalities and fragmented access to care, including several Latin American regions (Macinko et al., 2019).

Interestingly, disease-specific biomarkers demonstrate the lowest relative priority among the variables presented. Although laboratory and physiological targets remain essential components of evidence-based medicine, their isolated optimization may not always align with the overall needs of patients with multimorbidity. Strict control of blood glucose, blood pressure, or lipid levels may sometimes increase adverse effects, medication burden, hypoglycemia

risk, falls, or functional decline in vulnerable populations. This finding highlights the limitations of applying rigid disease-centered guidelines without individualized clinical judgment (Boyd et al., 2005).

Figure 5.

Relationship between multimorbidity and healthcare utilization

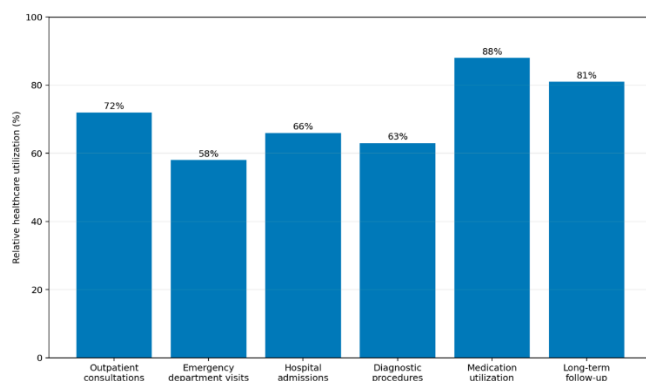


Figure 5 illustrates the relationship between multimorbidity and healthcare utilization across different dimensions of medical care. Medication utilization and long-term follow-up demonstrate the highest relative values, followed by outpatient consultations, hospital admissions, diagnostic procedures, and emergency department visits. These findings emphasize the substantial impact that multimorbidity exerts on healthcare systems, particularly within internal medicine and geriatric care services.

Medication utilization appears as the most prominent component of healthcare use. Patients with multiple chronic diseases frequently require prolonged pharmacological management involving antihypertensives, hypoglycemic agents, lipid-lowering drugs, anticoagulants, analgesics, respiratory medications, antidepressants, and other therapies prescribed simultaneously. This reinforces the concept that multimorbidity is strongly associated with polypharmacy and continuous medication exposure, which in turn increases healthcare costs and the probability of medication-related complications (Pazan & Wehling, 2021).

Long-term follow-up also demonstrates a very high relative frequency. Individuals with multimorbidity often require continuous monitoring due to disease progression, treatment adjustments, laboratory surveillance, rehabilitation needs, and prevention of acute decompensation. Internal medicine services therefore play a central role in coordinating longitudinal care, particularly in older adults with complex clinical profiles. The need for prolonged follow-up additionally reflects the chronic and progressive nature of most non-communicable diseases associated with multimorbidity.

Outpatient consultations show elevated utilization as well. Patients with multiple chronic conditions frequently attend appointments with internists, cardiologists, nephrologists, endocrinologists, pulmonologists, neurologists, and other specialists. This phenomenon contributes to healthcare fragmentation and may complicate continuity of care when communication between providers is limited. In many cases, internal medicine physicians become responsible for integrating information from different specialties into individualized treatment strategies (Macinko et al., 2019).

Hospital admissions remain another major consequence of clinical complexity. Acute exacerbations, infections, cardiovascular instability, medication-related adverse events, falls, and metabolic decompensation frequently lead to hospitalization in patients with multimorbidity. Frailty and reduced physiological reserve further increase susceptibility to hospitalization-related complications such as delirium, functional decline, immobilization, and healthcare-associated infections (American Geriatrics Society Expert Panel, 2012).

Diagnostic procedures also demonstrate substantial utilization. Patients with overlapping chronic diseases often require repeated laboratory tests, imaging studies, cardiovascular evaluation, pulmonary function testing, renal monitoring, and neurological assessment. While these investigations are essential for clinical management, excessive diagnostic burden may increase healthcare expenditures and patient stress, particularly in vulnerable populations.

Emergency department visits, although relatively lower than other categories, still represent a significant component of healthcare utilization. Emergency consultations frequently occur due to acute decompensation, uncontrolled symptoms, medication complications, or limited outpatient access. In healthcare systems with fragmented chronic disease management, emergency departments may become substitute entry points for patients unable to access coordinated longitudinal care.

From a public health perspective, Figure 5 highlights the substantial organizational and economic burden associated with multimorbidity. The growing prevalence of chronic diseases among aging populations increases demand for medical personnel, pharmaceutical resources, hospital infrastructure, rehabilitation services, and long-term healthcare planning. This situation is particularly relevant in countries such as Mexico, Colombia, and Ecuador, where healthcare systems continue adapting to demographic aging and increasing chronic disease prevalence while simultaneously facing economic and structural limitations (Huaquía-Díaz et al., 2021).

Figure 6.

Comparative regional perspective of multimorbidity-related challenges in Mexico, Colombia, and Ecuador

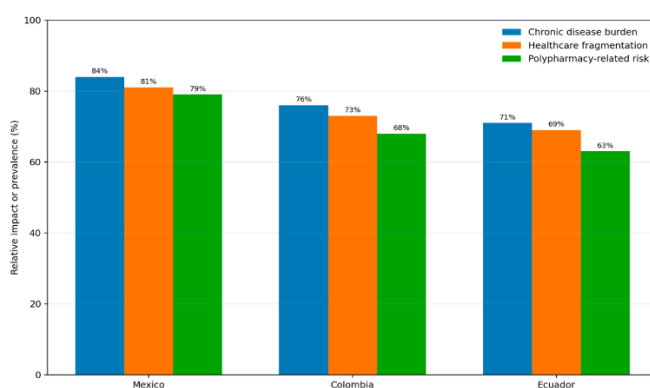


Figure 6 presents a comparative overview of selected multimorbidity-related challenges in Mexico, Colombia, and Ecuador, focusing on chronic disease burden, healthcare fragmentation, and polypharmacy-related risk. Although all three countries demonstrate elevated values across the analyzed domains, Mexico shows the highest relative impact, followed by Colombia and Ecuador. These findings reflect the growing epidemiological and healthcare challenges associated with chronic disease management in Latin American populations.

The chronic disease burden demonstrates consistently elevated values in all three countries, supporting the observation that demographic aging and epidemiological transition are significantly transforming healthcare systems throughout the region. In Mexico, the highest relative burden may be associated with increased prevalence of obesity, diabetes mellitus, hypertension, cardiovascular disease, and chronic kidney disease, conditions that frequently coexist and contribute to complex long-term management needs. Colombia and Ecuador similarly demonstrate substantial chronic disease prevalence, reflecting broader regional transitions toward non-communicable disease dominance (Macinko et al., 2019).

Healthcare fragmentation also appears prominently across the three countries. Fragmentation may involve limited coordination between primary care services, specialty consultations, hospital systems, and long-term follow-up programs. In patients with multimorbidity, fragmented care can contribute to duplicated diagnostic procedures, inconsistent therapeutic recommendations, medication overload, and reduced continuity of care. These challenges are particularly relevant in healthcare systems where access disparities, administrative barriers, and regional resource limitations affect service integration.

Mexico demonstrates the highest relative value for healthcare fragmentation in the figure. This may reflect the complexity of managing large populations with heterogeneous access to healthcare services and varying levels of institutional coverage. Colombia and Ecuador also demonstrate significant fragmentation patterns, particularly in rural or underserved regions where specialized medical services may be limited. As a result, patients with multiple chronic diseases may experience delays in diagnosis, interruptions in treatment continuity, and reduced multidisciplinary coordination.

Polypharmacy-related risk demonstrates elevated values across all three countries as well. The coexistence of multiple chronic diseases frequently requires prolonged pharmacological management, increasing the probability of adverse drug reactions, drug-drug interactions, treatment non-adherence, cognitive complications, and hospitalization (Pazan & Wehling, 2021). This issue becomes especially important among older adults and frail populations, where physiological vulnerability amplifies medication-related harm.

The figure additionally reflects the broader influence of social determinants of health in Latin America. Economic inequality, educational limitations, reduced healthcare accessibility, nutritional disparities, and lower health literacy may all contribute to earlier disease onset, delayed diagnosis, and reduced chronic disease control. Consequently, multimorbidity in these countries frequently develops under conditions of social and structural vulnerability, increasing the overall burden on healthcare systems (Huaquía-Díaz et al., 2021).

Another important observation involves the similarity of patterns between the countries despite differences in healthcare organization and population size. This suggests that multimorbidity and clinical complexity are not isolated national issues but rather regional public health challenges associated with aging populations and chronic disease expansion throughout Latin America.

From an internal medicine perspective, the findings reinforce the necessity of integrated healthcare models emphasizing preventive medicine, continuity of care, interdisciplinary collaboration, medication safety, and patient-centered management. The growing burden observed in Mexico, Colombia, and Ecuador highlights the importance of strengthening primary care systems, improving coordination between specialties, and expanding geriatric-oriented healthcare strategies.

DISCUSIÓN

The findings presented throughout this review reinforce the growing recognition that multimorbidity and clinical complexity represent central challenges in contemporary internal medicine. The increasing coexistence of chronic diseases, frailty, polypharmacy, cognitive decline, and social vulnerability has progressively transformed the profile of patients encountered in outpatient clinics, emergency departments, hospital wards, and long-term care settings. Consequently, modern internal medicine no longer focuses exclusively on isolated disease management but increasingly requires multidimensional and patient-centered approaches capable of integrating biological, functional, psychological, and social variables simultaneously.

One of the most important observations derived from the analyzed evidence is the strong relationship between aging and multimorbidity burden. The results demonstrate a progressive increase in chronic disease accumulation with advancing age, particularly after the sixth decade of life. These findings are consistent with previous epidemiological investigations showing that older adults frequently present combinations of cardiovascular disease, diabetes mellitus, chronic kidney disease, osteoarthritis, chronic respiratory disease, depression, and neurodegenerative disorders (Marengoni et al., 2011). However, the evidence also suggests that multimorbidity is increasingly affecting middle-aged populations, especially in regions experiencing rapid epidemiological transition and rising obesity prevalence.

This pattern has major implications for healthcare systems because patients with multimorbidity often require continuous medical supervision, long-term pharmacological treatment, rehabilitation services, repeated diagnostic procedures, and interdisciplinary care coordination. The elevated healthcare utilization observed in the results supports previous studies demonstrating that patients with multiple chronic conditions generate disproportionately higher healthcare expenditures compared with individuals affected by single diseases (Nicholson et al., 2024). In practical terms, this means that healthcare sustainability increasingly depends on the capacity of healthcare systems to manage chronic disease complexity efficiently and prevent avoidable complications.

Another major finding involves the multidimensional nature of clinical complexity. The results indicate that chronic disease accumulation alone cannot fully explain the difficulties encountered in internal medicine decision-making. Factors such as polypharmacy, frailty, cognitive impairment, healthcare fragmentation, and adverse social determinants significantly contribute to patient vulnerability and therapeutic uncertainty. This observation aligns with previous literature emphasizing that multimorbidity should not be interpreted merely as a numerical count of diagnoses but rather as a dynamic interaction between physiological decline, functional limitations, psychological factors, and environmental conditions (Tinetti et al., 2012).

Polypharmacy emerged as one of the most clinically relevant issues throughout the review. The evidence demonstrated that medication burden substantially increases the risk of adverse drug reactions, treatment non-adherence, hospitalization, falls, delirium, and cognitive complications. These findings coincide with investigations by Pazan and Wehling (2021), who described polypharmacy as one of the principal determinants of preventable morbidity among older adults. In many cases, medications prescribed according to disease-specific guidelines may unintentionally contribute to therapeutic overload when applied simultaneously in patients with multiple chronic illnesses.

This problem highlights one of the principal limitations of traditional disease-centered medicine. Clinical practice guidelines are generally developed for isolated conditions under controlled study populations that may not adequately represent frail or multimorbid patients commonly encountered in real-world internal medicine practice. Boyd et al.

(2005) previously demonstrated that strict adherence to multiple guidelines simultaneously could generate contradictory recommendations and excessive therapeutic complexity in geriatric patients. The current findings further support the need for individualized clinical judgment capable of balancing evidence-based recommendations with patient priorities, functional capacity, and overall prognosis.

Frailty also emerged as a major determinant of poor outcomes and clinical vulnerability. Patients presenting frailty syndromes frequently exhibit reduced physiological reserve and diminished tolerance to acute stressors such as infections, surgery, hospitalization, or medication changes. The coexistence of frailty and multimorbidity significantly increases the probability of disability, dependency, institutionalization, and mortality. These findings reinforce the importance of comprehensive geriatric assessment as an essential component of internal medicine practice, particularly in aging populations. Functional evaluation, cognitive assessment, nutritional screening, and social support analysis should therefore be integrated routinely into chronic disease management strategies.

The results additionally highlight the growing relevance of patient-centered care and shared decision-making in contemporary medicine. Traditional biomedical models have historically prioritized disease-specific biomarkers such as blood pressure levels, glucose control, or lipid targets. However, the analyzed evidence suggests that patients with multimorbidity frequently prioritize outcomes related to symptom control, independence, functionality, quality of life, and treatment feasibility over isolated laboratory objectives (Hoffmann et al., 2018). This observation is particularly relevant in older adults with advanced frailty or limited life expectancy, where aggressive therapeutic strategies may increase treatment burden without substantially improving meaningful outcomes.

The importance of patient preferences demonstrated in the results also reflects broader ethical considerations within modern internal medicine. Shared decision-making requires physicians to recognize patients as active participants in therapeutic planning rather than passive recipients of treatment. Effective communication therefore becomes essential for aligning medical interventions with individual goals, values, and social realities. Brown et al. (2022) previously reported that patients with multimorbidity value continuity of care, trust in healthcare professionals, and individualized communication, particularly when navigating complex medication regimens and chronic symptom burden.

From a public health perspective, the findings reveal that multimorbidity constitutes not only a clinical problem but also a major societal challenge. The comparative regional analysis involving Mexico, Colombia, and Ecuador demonstrates that chronic disease burden, healthcare fragmentation, and polypharmacy-related risks are consistently elevated across Latin American healthcare systems. These trends likely reflect broader demographic and epidemiological transitions associated with aging populations, urbanization, sedentary lifestyles, nutritional changes, and increasing obesity prevalence.

Social determinants of health additionally appear to exert substantial influence on multimorbidity outcomes. Poverty, educational limitations, restricted healthcare access, rural residence, nutritional insecurity, and low health literacy may accelerate chronic disease progression and reduce treatment adherence. Consequently, patients from socioeconomically vulnerable populations frequently experience earlier onset of multimorbidity and more severe clinical complications. This observation supports previous findings indicating that multimorbidity disproportionately affects disadvantaged populations and contributes to widening healthcare inequalities (Huaquía-Díaz et al., 2021).

Healthcare fragmentation represents another critical issue identified throughout the analysis. Patients with multiple chronic diseases commonly consult numerous specialists independently, resulting in duplicated diagnostic testing,

inconsistent therapeutic recommendations, and reduced continuity of care. In this context, internal medicine assumes a crucial coordinating role by integrating multidisciplinary information into coherent and individualized management plans. Strengthening communication between healthcare professionals and promoting integrated care models may therefore improve therapeutic safety and healthcare efficiency.

The findings also emphasize the importance of deprescribing strategies and medication review programs in multimorbid populations. Reeve et al. (2022) demonstrated that structured deprescribing interventions may reduce medication burden and improve patient-centered outcomes when implemented appropriately. Nevertheless, deprescribing requires careful risk-benefit evaluation because inappropriate discontinuation may also precipitate disease destabilization. Consequently, medication optimization should be individualized and continuously reassessed according to patient evolution and therapeutic goals.

Another relevant discussion point involves the implications for medical education and professional training. As patient populations become increasingly complex, healthcare professionals require competencies extending beyond traditional disease-based learning models. Modern internal medicine education must incorporate training in geriatric assessment, polypharmacy management, interdisciplinary collaboration, communication skills, ethical reasoning, and patient-centered decision-making. Future physicians must be prepared to manage uncertainty, prioritize competing therapeutic goals, and integrate psychosocial dimensions into clinical reasoning processes.

Despite the broad analytical scope of this review, several limitations should be acknowledged. First, the study relied primarily on published scientific literature and therefore depends on the methodological quality and heterogeneity of existing investigations. Variability in multimorbidity definitions, epidemiological methodologies, and healthcare contexts may limit direct comparability between studies. Additionally, many available investigations originate from high-income countries, potentially reducing generalizability to certain Latin American healthcare systems. Nevertheless, the inclusion of regional perspectives involving Mexico, Colombia, and Ecuador contributes to contextualizing the findings within middle-income healthcare environments.

Another limitation involves the predominantly narrative nature of the review. Although the selected methodology allowed comprehensive integration of clinical and public health perspectives, quantitative meta-analytic synthesis was not performed. Future investigations may benefit from prospective cohort studies, multicenter epidemiological analyses, and healthcare system evaluations specifically focused on multimorbidity patterns in Latin America.

CONCLUSIÓN

Conclusion

Multimorbidity and clinical complexity have emerged as defining characteristics of contemporary internal medicine, particularly within aging populations and healthcare systems increasingly dominated by chronic non-communicable diseases. The coexistence of multiple chronic conditions, combined with frailty, polypharmacy, cognitive impairment, functional decline, and adverse social determinants, substantially modifies clinical decision-making processes and challenges traditional disease-centered models of care.

The evidence analyzed throughout this review demonstrates that multimorbidity extends beyond the simple accumulation of diagnoses. Instead, it represents a multidimensional phenomenon involving biological, functional, psychological, social, and healthcare-system interactions that collectively influence patient outcomes, healthcare utilization, and quality of life. As chronic disease burden continues to increase worldwide, internal medicine physicians are progressively required to integrate individualized clinical reasoning with evidence-based therapeutic strategies capable of addressing complex and heterogeneous patient profiles.

One of the principal findings of this review is the growing importance of patient-centered care and shared decision-making in modern medical practice. Patients with multimorbidity frequently prioritize symptom control, functional preservation, independence, treatment feasibility, and quality of life over isolated disease-specific biomarkers. Consequently, healthcare professionals must balance scientific recommendations with patient preferences, functional capacity, prognosis, and psychosocial context in order to optimize long-term outcomes.

The review additionally highlights the significant impact of polypharmacy and healthcare fragmentation on patient safety and therapeutic complexity. Medication burden, adverse drug reactions, treatment non-adherence, hospitalization, and cognitive complications represent major clinical concerns, particularly among frail older adults. These findings reinforce the importance of medication review, deprescribing strategies, interdisciplinary collaboration, and continuity of care within internal medicine and geriatric practice.

From a public health perspective, the comparative regional findings involving Mexico, Colombia, and Ecuador demonstrate that multimorbidity constitutes a major healthcare challenge throughout Latin America. Population aging, epidemiological transition, healthcare inequalities, and chronic disease expansion continue to increase pressure on healthcare systems already facing structural and economic limitations. Addressing these challenges will require integrated healthcare models emphasizing prevention, primary care strengthening, multidisciplinary coordination, and equitable healthcare access.

The study also underscores the necessity of transforming medical education and healthcare organization. Future healthcare professionals must develop competencies related to complex clinical reasoning, geriatric assessment, communication skills, ethical decision-making, and humanistic patient-centered care. Contemporary internal medicine increasingly demands physicians capable of managing uncertainty, prioritizing individualized therapeutic goals, and integrating multiple dimensions of patient vulnerability into clinical practice.

Ultimately, multimorbidity and clinical complexity are redefining the future of internal medicine. Effective management of these conditions will depend not only on scientific and technological advances but also on the capacity of healthcare systems and professionals to provide coordinated, compassionate, interdisciplinary, and individualized care adapted to the realities of increasingly complex patient populations.

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