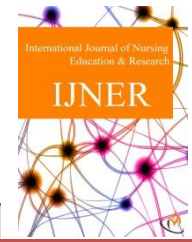




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# MULTIDIMENSIONAL PERSPECTIVES ON SUCCESSFUL AGING WITH HIV AND COPD: CLINICAL INSIGHTS, CARE STRATEGIES, AND FUTURE DIRECTIONS.

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### ABSTRACT

The Successful aging in individuals living with Human Immunodeficiency Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD) represents a complex and multidimensional challenge that extends beyond traditional disease-focused paradigms. With advancements in antiretroviral therapy and respiratory care, life expectancy has significantly improved, resulting in a growing population of older adults managing both conditions concurrently. This review synthesizes current evidence on the epidemiology, pathophysiological interactions, and biopsychosocial determinants influencing aging with HIV and COPD. It highlights the compounded impact of chronic inflammation, immune dysregulation, multimorbidity, and polypharmacy on functional status, mental health, and overall quality of life. The review further explores the role of nutrition, physical activity, and pharmacological management, alongside the contributions of nursing and allied health professionals in delivering integrated, patient-centered care. Emerging frameworks, including biopsychosocial, resilience-based, and life-course approaches, are discussed to provide a comprehensive understanding of successful aging in this population. Additionally, the paper identifies critical research gaps and methodological limitations, emphasizing the need for longitudinal, multidisciplinary, and globally inclusive studies. Policy, ethical, and legal considerations are also examined in the context of equitable and dignified healthcare delivery. Ultimately, this review underscores the importance of shifting toward holistic and adaptive care models that prioritize functional independence, well-being, and social participation. By integrating clinical insights with innovative care strategies and addressing existing research gaps, this work aims to inform future research, guide clinical practice, and support the development of effective interventions that promote successful aging among individuals living with HIV and COPD.

### INTRODUCTION

Successful aging has emerged as a critical concept in contemporary healthcare, particularly in the context of chronic and life-limiting conditions such as Human Immunodeficiency Virus (HIV) infection and Chronic Obstructive Pulmonary Disease (COPD).

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Advances in antiretroviral therapy have transformed HIV into a manageable chronic illness, enabling individuals to live longer, while improved diagnostic and therapeutic strategies have also extended the lifespan of patients with COPD. However, longevity in these populations is frequently accompanied by complex clinical challenges, including multimorbidity, functional decline, and reduced quality of life, thereby necessitating a multidimensional approach to [1] Successful aging in this context extends beyond mere survival and encompasses physical health,



psychological well-being, social engagement, and the ability to adapt to chronic disease burdens. Individuals aging with HIV and COPD face overlapping and synergistic health challenges, including chronic inflammation, immune dysregulation, respiratory impairment, and increased vulnerability to comorbid conditions such as cardiovascular disease, metabolic disorders, and neurocognitive decline. These biological factors are further compounded by psychosocial determinants, including stigma, social isolation, economic instability, and disparities in access to healthcare services, which significantly influence health outcomes. Moreover, the coexistence of HIV and COPD often leads to polypharmacy and complex treatment regimens, increasing the risk of drug–drug interactions, adverse effects, and reduced adherence.[2] In recent years, there has been growing recognition of the need to integrate biopsychosocial models and patient-centered care frameworks to better understand and promote successful aging in these populations. Such approaches emphasize the importance of resilience, self-management, and supportive care systems in enhancing functional independence and overall well-being. Nursing and allied health professionals play a pivotal role in this paradigm by delivering holistic care, facilitating health education, and coordinating multidisciplinary interventions tailored to individual needs. Furthermore, innovations in digital health and telemedicine offer promising avenues for improving disease monitoring, adherence, and access to care, particularly in resource-limited settings. Despite these advances, significant gaps remain in understanding the long-term trajectories of aging with HIV and COPD, especially in diverse global contexts where healthcare systems, cultural norms, and socioeconomic conditions vary widely. Therefore, a comprehensive review of clinical insights, care strategies, and emerging frameworks is essential to inform evidence-based practice, guide policy development, and identify priorities for future research.[3] This review aims to synthesize current knowledge on the multidimensional aspects of successful aging in individuals with HIV and COPD, highlighting the interplay of biological, psychological, and social factors, while exploring innovative care models and addressing critical research gaps that must be bridged to improve outcomes and quality of life in this growing population.

### **Epidemiology of HIV and COPD in Aging Populations**

The epidemiology of Human Immunodeficiency Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD) in aging populations reflects a significant and evolving global health challenge characterized by

increasing prevalence, shifting demographic patterns, and complex disease interactions. With the widespread availability and effectiveness of antiretroviral therapy (ART), people living with HIV (PLWH) are experiencing substantially improved life expectancy, resulting in a growing proportion of individuals aged 50 years and older within this population. Globally, it is estimated that nearly half of PLWH are now over the age of 50, particularly in high-income countries, with similar trends emerging in low- and middle-income regions due to expanded treatment access. Aging with HIV is associated with an increased burden of non-communicable diseases, among which COPD has gained prominence as a significant comorbidity[4]. COPD itself is a leading cause of morbidity and mortality worldwide and is strongly associated with aging, long-term exposure to tobacco smoke, environmental pollutants, occupational hazards, and recurrent respiratory infections. In individuals with HIV, the prevalence of COPD is disproportionately higher compared to the general population, even after adjusting for traditional risk factors such as smoking. This elevated risk is attributed to HIV-related immune dysfunction, chronic systemic inflammation, recurrent pulmonary infections, and potential toxicities associated with long-term ART. Epidemiological studies indicate that PLWH have a higher likelihood of developing airflow limitation, reduced lung function, and earlier onset of COPD, often presenting at younger ages than HIV-negative individuals. Additionally, the burden of COPD among aging PLWH is compounded by socioeconomic and behavioral determinants, including higher rates of smoking, substance use, and limited access to preventive healthcare services in certain populations.[5] Geographic variations further highlight disparities in disease burden, with sub-Saharan Africa bearing a dual burden of high HIV prevalence and increasing exposure to biomass fuels and urban air pollution, while developed countries report higher COPD prevalence linked to smoking and aging demographics. Gender differences are also evident, as women with HIV may experience distinct risk profiles and disease progression patterns influenced by biological, hormonal, and social factors. Furthermore, the co-occurrence of HIV and COPD contributes to increased healthcare utilization, hospitalizations, and mortality, emphasizing the need for integrated surveillance and management strategies. Despite growing recognition of this dual burden, epidemiological data remain limited in many regions, particularly in low-resource settings, where underdiagnosis and inadequate reporting hinder accurate assessment. Consequently, there is an urgent need for robust population-based studies and longitudinal research to better understand incidence, prevalence, and



risk factors associated with HIV and COPD in aging populations, thereby informing targeted interventions and

healthcare planning aimed at improving outcomes in this vulnerable and expanding demographic group.[6]

**Table 1 – Epidemiological and Risk Factors Overview**

| Parameter             | HIV in Aging Population          | COPD in Aging Population         | Combined HIV + COPD Impact       | Clinical Implication           |
|-----------------------|----------------------------------|----------------------------------|----------------------------------|--------------------------------|
| Prevalence            | Increasing ≥50 years (≈50% PLWH) | High in elderly populations      | Rising co-prevalence             | Need for integrated screening  |
| Major Risk Factors    | Immunosuppression, ART exposure  | Smoking, pollution, infections   | Synergistic risk amplification   | Early risk assessment required |
| Age of Onset          | Earlier aging phenotype          | Typically >40 years              | Earlier COPD onset in PLWH       | Accelerated aging phenomenon   |
| Geographic Trends     | High in Sub-Saharan Africa       | High in industrialized regions   | Dual burden in LMICs             | Region-specific strategies     |
| Gender Differences    | Women face higher stigma         | Increasing prevalence in females | Differential disease progression | Gender-sensitive care          |
| Mortality & Morbidity | Reduced with ART                 | Leading cause of death globally  | Increased hospitalization risk   | Multidisciplinary management   |

### Biopsychosocial Determinants of Aging with HIV and COPD

Aging with Human Immunodeficiency Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD) is shaped by a complex interplay of biological, psychological, and social determinants that collectively influence health trajectories, functional capacity, and overall quality of life. From a biological perspective, individuals living with HIV and COPD experience accelerated aging processes driven by chronic immune activation, systemic inflammation, oxidative stress, and immune senescence, which contribute to the early onset of comorbidities such as cardiovascular disease, osteoporosis, metabolic disorders, and neurocognitive decline. HIV infection itself, even when well-controlled with antiretroviral therapy, is associated with persistent low-grade inflammation, while COPD is characterized by progressive airflow limitation and pulmonary inflammation, further compounding physiological burden.[7] Additionally, long-term pharmacotherapy, including antiretroviral drugs and respiratory medications, increases the risk of polypharmacy, adverse drug reactions, and drug–drug interactions, complicating disease management in older adults. Psychologically, individuals aging with HIV and COPD often face significant mental health challenges, including depression, anxiety, cognitive impairment, and reduced coping capacity, which are exacerbated by chronic disease burden, fear of disease progression, and uncertainty about future health outcomes. The psychological impact is further intensified by stigma associated with HIV, as well as the disabling nature of

COPD symptoms such as breathlessness and fatigue, which can lead to social withdrawal and diminished self-efficacy. Social determinants play an equally critical role, as factors such as socioeconomic status, education, access to healthcare, housing stability, and social support networks significantly influence disease outcomes and successful aging.[8] Many individuals living with HIV, particularly in low- and middle-income countries, face economic hardship, limited access to quality healthcare services, and structural barriers that hinder timely diagnosis and treatment of COPD. Behavioral factors, including smoking, alcohol use, and poor adherence to treatment regimens, are more prevalent in certain populations and contribute to disease progression and poorer outcomes. Social isolation, discrimination, and marginalization further exacerbate health disparities, reducing engagement with healthcare systems and limiting access to supportive resources. Importantly, resilience, coping strategies, and community support can act as protective factors that promote better health outcomes and enhance the experience of aging despite chronic illness.[9] The biopsychosocial model thus provides a comprehensive framework for understanding the multifaceted nature of aging with HIV and COPD, emphasizing the need for integrated, patient-centered approaches that address not only medical management but also psychological well-being and social support. Recognizing and addressing these determinants is essential for optimizing functional independence, improving quality of life, and achieving the broader goal of successful aging in this vulnerable and growing population.





**Figure 1: Biopsychosocial Determinants of Aging with HIV and COPD**

### Impact of Multimorbidity and Polypharmacy

The impact of multimorbidity and polypharmacy in individuals aging with Human Immunodeficiency Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD) represents a critical challenge in contemporary clinical practice, significantly influencing disease outcomes, functional status, and quality of life. As advances in antiretroviral therapy have extended the lifespan of people living with HIV, there has been a parallel increase in age-related comorbidities, including cardiovascular disease, diabetes mellitus, osteoporosis, renal impairment, malignancies, and mental

health disorders, many of which coexist with COPD. This clustering of multiple chronic conditions, or multimorbidity, creates a complex clinical profile characterized by overlapping symptoms, competing treatment priorities, and increased vulnerability to adverse health outcomes. COPD itself contributes to systemic inflammation and hypoxia, further exacerbating comorbid conditions and accelerating functional decline. In this context, polypharmacy—commonly defined as the concurrent use of five or more medications—becomes almost inevitable, as patients require antiretroviral regimens alongside bronchodilators, corticosteroids,



antibiotics, and medications for other chronic diseases. While pharmacotherapy is essential for disease control, polypharmacy significantly increases the risk of drug–drug interactions, medication errors, cumulative toxicity, and adverse drug reactions, particularly in older adults with altered pharmacokinetics and pharmacodynamics [10]. For instance, certain antiretroviral drugs may interact with inhaled or systemic corticosteroids, leading to complications such as adrenal suppression or metabolic disturbances, while the use of multiple central nervous system-active agents may increase the risk of cognitive impairment and falls. Additionally, the complexity of medication regimens can negatively impact adherence, especially in individuals with cognitive decline, low health literacy, or limited social support, thereby compromising therapeutic effectiveness. Multimorbidity and polypharmacy also place a substantial burden on healthcare systems, resulting in increased hospitalizations, frequent healthcare visits, and higher healthcare costs. From a patient-centered perspective, the cumulative burden of managing multiple conditions and medications can lead to treatment fatigue, reduced self-efficacy, and diminished quality of life. Importantly, the presence of multimorbidity necessitates a shift from disease-specific care models to holistic, integrated approaches that prioritize patient goals, functional outcomes, and individualized care plans.[11] Deprescribing strategies, regular medication reviews, and the use of clinical decision-support tools are essential in minimizing unnecessary medication use and optimizing therapeutic regimens. Interprofessional collaboration among physicians, pharmacists, nurses, and other healthcare providers plays a pivotal role in ensuring safe and effective medication management. Ultimately, addressing the challenges of multimorbidity and polypharmacy is fundamental to promoting successful aging in individuals with HIV and COPD, requiring a balanced approach that maximizes therapeutic benefits while minimizing potential harms.

### **Pathophysiological Interactions Between HIV and COPD**

The pathophysiological interactions between Human Immunodeficiency Virus (HIV) infection and Chronic Obstructive Pulmonary Disease (COPD) are complex and multifactorial, involving overlapping mechanisms of immune dysregulation, chronic inflammation, oxidative stress, and structural lung damage that collectively accelerate disease progression and functional decline in aging individuals. HIV infection, even in the era of effective antiretroviral therapy (ART), is characterized by persistent immune activation and systemic inflammation, driven by ongoing viral replication in reservoirs, microbial translocation from the gut, and dysregulated cytokine production. This

chronic inflammatory state contributes to endothelial dysfunction, tissue injury, and accelerated aging processes, which also play a central role in the pathogenesis of COPD. In the lungs, HIV is associated with impaired innate and adaptive immune responses, including dysfunction of alveolar macrophages, reduced mucociliary clearance, and altered T-cell responses, rendering individuals more susceptible to recurrent respiratory infections such as bacterial pneumonia and tuberculosis. [5] These repeated infections lead to cumulative lung injury, airway remodeling, and destruction of alveolar architecture, hallmark features of COPD. Additionally, HIV-related depletion of CD4+ T cells and imbalance between pro-inflammatory and anti-inflammatory pathways further exacerbate pulmonary inflammation and tissue damage. Oxidative stress is another key mechanism linking HIV and COPD, as both conditions are associated with increased production of reactive oxygen species and reduced antioxidant defenses, resulting in cellular damage, apoptosis, and impaired tissue repair. Environmental and behavioral factors, particularly cigarette smoking, which is highly prevalent among people living with HIV, synergistically amplify these pathological processes by promoting oxidative injury, inflammation, and protease–antiprotease imbalance within the lungs. Furthermore, long-term exposure to certain antiretroviral drugs may contribute to mitochondrial dysfunction and metabolic alterations, indirectly influencing pulmonary health and systemic inflammation[12]. The structural and functional consequences of these interactions include airflow limitation, reduced lung elasticity, emphysematous changes, and impaired gas exchange, often occurring at younger ages and with greater severity in HIV-positive individuals compared to the general population. Emerging evidence also suggests that HIV may alter the lung microbiome, leading to dysbiosis that perpetuates inflammation and disease progression. Importantly, the bidirectional relationship between HIV and COPD not only worsens respiratory outcomes but also contributes to systemic complications, including cardiovascular disease and muscle wasting, further impacting overall health status. Understanding these intertwined pathophysiological mechanisms is essential for developing targeted therapeutic strategies, improving early diagnosis, and optimizing integrated care approaches aimed at mitigating disease burden and promoting successful aging in individuals living with both HIV and COPD.

### **Mental Health and Cognitive Impairment in Aging Populations**

Mental health and cognitive impairment are critical and often underrecognized components of aging in individuals living with Human Immunodeficiency



Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD), significantly influencing disease outcomes, treatment adherence, and overall quality of life. As individuals with HIV live longer due to advances in antiretroviral therapy, there is a growing prevalence of neurocognitive disorders collectively referred to as HIV-associated neurocognitive disorders (HAND), which range from asymptomatic impairment to more severe forms affecting memory, attention, executive function, and psychomotor speed. Similarly, COPD is increasingly associated with cognitive decline, primarily due to chronic hypoxia, systemic inflammation, and reduced cerebral perfusion, which can impair neuronal function and accelerate neurodegeneration[13]. The coexistence of HIV and COPD creates a compounded risk for cognitive dysfunction, as shared mechanisms such as chronic inflammation, oxidative stress, vascular injury, and immune dysregulation synergistically affect brain health. In addition to cognitive impairment, mental health disorders such as depression, anxiety, and substance use disorders are highly prevalent in this population. The psychological burden of living with chronic, stigmatized, and potentially disabling conditions contributes to emotional distress, reduced coping capacity, and social withdrawal. Depression, in particular, is strongly associated with poor adherence to antiretroviral and respiratory therapies, leading to suboptimal disease control and increased risk of exacerbations and hospitalizations. Anxiety disorders may further exacerbate respiratory symptoms in COPD, such as dyspnea, creating a vicious cycle of physical and psychological distress. Social isolation, stigma related to HIV status, and limitations in daily functioning due to COPD symptoms further intensify mental health challenges, especially among older adults who may already face reduced social support networks. Cognitive impairment also complicates self-management, as patients may struggle with medication adherence, appointment scheduling, and recognition of symptom worsening, thereby increasing the risk of adverse health outcomes. Furthermore, the use of multiple medications, including those with central nervous system effects, may contribute to cognitive decline and increase the risk of delirium or sedation in older individuals. Importantly, early identification and management of mental health and cognitive issues are essential for promoting successful aging. Comprehensive assessment using validated screening tools, integration of mental health services into routine care, and multidisciplinary interventions involving psychologists, psychiatrists, nurses, and social workers can significantly improve outcomes. Non-pharmacological strategies such as cognitive training, physical activity, social engagement, and behavioral therapies have shown promise in enhancing cognitive function and psychological well-being. Addressing

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mental health and cognitive impairment is therefore a fundamental aspect of holistic care, requiring a patient-centered approach that recognizes the interconnectedness of physical, psychological, and social dimensions of health in individuals aging with HIV and COPD.[14]

### **Role of Nutrition and Physical Activity in Successful Aging**

The role of nutrition and physical activity in promoting successful aging among individuals living with Human Immunodeficiency Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD) is increasingly recognized as a cornerstone of holistic and patient-centered care, with significant implications for functional capacity, immune function, and overall quality of life. Aging with these chronic conditions is often accompanied by metabolic alterations, muscle wasting, reduced exercise tolerance, and increased vulnerability to frailty, all of which can be mitigated through targeted lifestyle interventions. Nutritional status plays a pivotal role, as individuals with HIV may experience weight loss, micronutrient deficiencies, and altered lipid metabolism, while COPD is frequently associated with cachexia, muscle depletion, and increased energy expenditure due to the work of breathing. [15] Adequate intake of macronutrients, particularly high-quality proteins, is essential to preserve lean body mass and prevent sarcopenia, while micronutrients such as vitamins A, C, D, E, and minerals like zinc and selenium contribute to antioxidant defense and immune regulation. Diets rich in fruits, vegetables, whole grains, and healthy fats, including omega-3 fatty acids, have been shown to reduce systemic inflammation and support cardiovascular and respiratory health. At the same time, individualized nutritional counseling is necessary to address barriers such as poor appetite, gastrointestinal side effects of medications, and socioeconomic constraints that may limit access to balanced diets. Physical activity is equally critical in enhancing successful aging, as regular exercise improves cardiorespiratory fitness, muscle strength, balance, and functional independence. In individuals with COPD, structured pulmonary rehabilitation programs incorporating aerobic and resistance training can significantly reduce dyspnea, improve exercise tolerance, and decrease the frequency of exacerbations. For people living with HIV, physical activity has been associated with improved immune function, reduced inflammation, and better mental health outcomes, including reduced depression and anxiety. Importantly, exercise interventions must be tailored to individual capabilities, taking into account disease severity, comorbidities, and baseline fitness levels, with gradual progression to avoid overexertion. [16] The synergistic effects of proper nutrition and regular physical activity extend beyond physical health, positively influencing cognitive function,



psychological well-being, and social engagement, thereby contributing to a more comprehensive definition of successful aging. Healthcare professionals, including nurses, dietitians, and physiotherapists, play a vital role in assessing nutritional status, designing individualized exercise programs, and providing ongoing education and support to promote adherence to lifestyle modifications. Despite strong evidence supporting these interventions, challenges such as limited resources, lack of awareness, and patient-related barriers continue to hinder implementation, particularly in low-resource settings. Therefore, integrating nutrition and physical activity into routine care and public health strategies is essential for optimizing health outcomes, reducing disease burden, and enhancing the overall well-being of individuals aging with HIV and COPD.

### **Pharmacological Management and Therapeutic Challenges**

Pharmacological management in individuals aging with Human Immunodeficiency Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD) is inherently complex, requiring careful balancing of efficacy, safety, and patient-centered considerations to address both conditions and their associated comorbidities. Antiretroviral therapy (ART) remains the cornerstone of HIV management, aiming to achieve sustained viral suppression, immune restoration, and prevention of disease progression, while COPD treatment typically involves bronchodilators, inhaled corticosteroids, phosphodiesterase inhibitors, and, in advanced cases, oxygen therapy. However, the coexistence of these conditions introduces significant therapeutic challenges, particularly due to polypharmacy and the high potential for drug–drug interactions. Many antiretroviral agents, especially protease inhibitors and pharmacokinetic boosters such as ritonavir or cobicistat, influence cytochrome P450 enzyme systems, which can alter the metabolism of commonly used COPD medications, including corticosteroids, leading to adverse effects such as adrenal suppression, Cushing’s syndrome, or systemic toxicity.[17] Additionally, age-related physiological changes, including reduced renal and hepatic function, altered body composition, and decreased drug clearance, further complicate pharmacokinetics and increase the risk of adverse drug reactions in older adults. The presence of multimorbidity necessitates the use of medications for cardiovascular disease, diabetes, mental health disorders, and other chronic conditions, thereby increasing pill burden and reducing adherence. Medication adherence is a critical determinant of therapeutic success, yet it is often compromised by regimen complexity, side effects, cognitive impairment, and socioeconomic barriers. Furthermore, long-term exposure to certain antiretroviral

drugs may contribute to metabolic complications such as dyslipidemia, insulin resistance, and osteoporosis, which require additional pharmacological management and monitoring. In COPD, inappropriate or overuse of inhaled corticosteroids may increase the risk of pneumonia, particularly in immunocompromised individuals with HIV, necessitating careful patient selection and risk assessment[18]. Another challenge lies in the limited inclusion of older adults with HIV and COPD in clinical trials, resulting in a lack of robust evidence to guide treatment decisions in this population. Personalized medicine approaches, including pharmacogenomics and therapeutic drug monitoring, hold promise in optimizing drug selection and dosing, but their application remains limited in routine practice. Interprofessional collaboration among physicians, pharmacists, nurses, and other healthcare providers is essential to ensure comprehensive medication review, identify potential interactions, and implement deprescribing strategies where appropriate. Patient education and shared decision-making are also critical in improving adherence and aligning treatment plans with individual preferences and goals. Ultimately, effective pharmacological management in this population requires an integrated, individualized approach that addresses both the biological complexity of coexisting conditions and the broader psychosocial factors influencing treatment outcomes, thereby supporting the overarching goal of successful aging.

### **Role of Nursing and Allied Health Professionals**

The role of nursing and allied health professionals in supporting successful aging among individuals living with Human Immunodeficiency Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD) is pivotal, encompassing comprehensive, patient-centered care that addresses the complex interplay of physical, psychological, and social needs. Nurses serve as frontline providers who coordinate care across the continuum, ensuring effective disease management, early identification of complications, and continuity of services through regular monitoring and follow-up. In the context of HIV and COPD, nursing responsibilities include medication management, adherence counseling, symptom assessment, and education on self-care practices such as inhaler techniques, infection prevention, and lifestyle modifications [19]. Advanced practice nurses, including nurse practitioners and clinical nurse specialists, play an expanded role in clinical decision-making, prescribing medications, and managing chronic conditions, particularly in settings with limited access to physicians. Allied health professionals, including physiotherapists, dietitians, psychologists, social workers, and occupational therapists, contribute essential expertise that



complements medical and nursing care. Physiotherapists are instrumental in delivering pulmonary rehabilitation programs that improve respiratory function, exercise tolerance, and overall physical capacity, while dietitians provide tailored nutritional interventions to address weight loss, malnutrition, and metabolic complications associated with HIV and COPD. Psychologists and mental health professionals support patients in coping with depression, anxiety, cognitive impairment, and the psychosocial burden of chronic illness, while social workers assist in addressing social determinants of health, including access to resources, financial support, and community services.[20] Occupational therapists help individuals maintain independence in daily activities by adapting environments and promoting functional skills. Interprofessional collaboration among these professionals fosters a holistic approach to care, ensuring that treatment plans are comprehensive, coordinated, and aligned with patient goals. Nurses also play a crucial role in health promotion and disease prevention by facilitating smoking cessation programs, vaccination campaigns, and early screening for comorbidities. In addition, they advocate for patient rights, reduce stigma associated with HIV, and promote culturally competent and inclusive care environments. The integration of digital health tools, such as telemonitoring and mobile health applications, has further expanded the capacity of nursing and allied health professionals to deliver care remotely, enhancing accessibility and continuity, especially for older adults with mobility limitations. Education and empowerment of patients and caregivers are central to this role, enabling individuals to actively participate in their care and make informed decisions. Despite their critical contributions, challenges such as workforce shortages, limited training in geriatric and chronic disease management, and resource constraints may hinder optimal service delivery. Therefore, strengthening the capacity and recognition of nursing and allied health professionals is essential for improving health outcomes, enhancing quality of life, and achieving successful aging in individuals with HIV and COPD.

### **Policy, Ethical, and Legal Considerations**

Policy, ethical, and legal considerations play a crucial role in shaping the care and outcomes of individuals aging with Human Immunodeficiency Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD), particularly in the context of evolving healthcare systems and increasing longevity. From a policy perspective, there is a growing need to develop integrated and inclusive health policies that address the complex needs of older adults living with chronic and coexisting conditions, ensuring equitable access to comprehensive care services, medications, rehabilitation programs, and long-term support. Policies must also

prioritize the inclusion of aging populations with HIV and COPD in national health agendas, emphasizing preventive care, early diagnosis, and continuity of care across primary, secondary, and tertiary healthcare levels. Ethical considerations are deeply intertwined with the principles of autonomy, beneficence, non-maleficence, and justice, particularly in managing chronic, stigmatized conditions such as HIV [21]. Respecting patient autonomy involves supporting informed decision-making, ensuring that individuals have the right to participate actively in their treatment plans, including decisions related to antiretroviral therapy, respiratory care, and end-of-life preferences. Issues of confidentiality and privacy are especially critical in HIV care, where disclosure of status can lead to stigma, discrimination, and social exclusion. Healthcare providers must maintain strict confidentiality while balancing the need for appropriate information sharing within multidisciplinary teams to ensure safe and effective care. Legal considerations further encompass patient rights, anti-discrimination laws, and regulatory frameworks that protect individuals from stigma and inequitable treatment in healthcare, employment, and social settings. In many regions, legal protections for people living with HIV have improved; however, gaps remain in enforcement and awareness, particularly in low- and middle-income countries. Additionally, the legal aspects of informed consent, advanced directives, and capacity assessment become increasingly relevant as patients age and may experience cognitive impairment or declining decision-making ability. Ethical dilemmas may arise in the allocation of limited healthcare resources, especially in resource-constrained settings, where prioritization of care must be balanced against fairness and equity.[22] Furthermore, the integration of digital health technologies introduces new ethical and legal challenges related to data security, patient privacy, and informed consent in telemedicine platforms. Healthcare professionals must navigate these complexities while adhering to professional standards and regulatory guidelines. Advocacy and policy reform are essential to address systemic barriers, promote inclusive healthcare environments, and ensure that vulnerable populations receive appropriate and dignified care. Ultimately, a comprehensive approach that integrates policy development, ethical principles, and legal safeguards is essential for protecting patient rights, reducing health disparities, and supporting successful aging in individuals living with HIV and COPD.

### **Emerging Frameworks for Understanding Successful Aging**

Emerging frameworks for understanding successful aging in individuals living with Human Immunodeficiency Virus (HIV) and Chronic Obstructive



Pulmonary Disease (COPD) have evolved beyond traditional biomedical models to incorporate multidimensional, patient-centered, and context-sensitive approaches that better capture the complexity of aging with chronic comorbidities. Historically, successful aging was defined primarily in terms of absence of disease and preservation of physical function; however, contemporary perspectives emphasize resilience, adaptability, and quality of life despite the presence of chronic illness. One of the most influential frameworks is the biopsychosocial model, which integrates biological, psychological, and social determinants to provide a holistic understanding of health and aging.[23] Complementing this, the concept of “healthy aging,” as promoted by global health organizations, focuses on maintaining functional ability and enabling individuals to do what they value, regardless of disease status. In the context of HIV and COPD, this shift is particularly relevant, as many individuals live with persistent symptoms and comorbidities yet can achieve meaningful and fulfilling lives through effective management and support systems. The resilience framework highlights the capacity of individuals to adapt to chronic illness, cope with adversity, and maintain psychological well-being, while the life-course approach examines how early-life exposures, socioeconomic conditions, and cumulative health risks influence aging trajectories. Additionally, patient-reported outcome frameworks emphasize the importance of subjective experiences, including perceived health status, symptom burden, and satisfaction with care, in evaluating successful aging. The integration of syndemic theory further enriches understanding by recognizing the interaction of multiple coexisting conditions, such as HIV, COPD, mental health disorders, and substance use, within specific social and environmental contexts that exacerbate health disparities. Frailty models have also gained prominence, focusing on vulnerability to stressors and decline in physiological reserves, which are particularly relevant in aging populations with chronic diseases. Furthermore, advances in digital health and precision medicine are contributing to the development of personalized aging frameworks that incorporate real-time monitoring, data analytics, and individualized risk assessment to optimize care. Interdisciplinary care models, including integrated and community-based approaches, are increasingly embedded within these frameworks to ensure coordinated and continuous care. Despite these advancements, challenges remain in operationalizing these frameworks across diverse healthcare settings, particularly in resource-limited environments.[24] Nonetheless, emerging frameworks collectively underscore the importance of shifting from disease-centered paradigms to holistic, inclusive, and adaptive models that prioritize functional independence, well-being, and social participation. These

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frameworks provide valuable guidance for clinicians, researchers, and policymakers in designing interventions and healthcare systems that support successful aging in individuals living with HIV and COPD.

### **Gaps in Current Research and Methodological Limitations**

Despite growing recognition of the complexities associated with aging in individuals living with Human Immunodeficiency Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD), significant gaps persist in current research, accompanied by notable methodological limitations that hinder comprehensive understanding and evidence-based decision-making. One of the primary challenges lies in the scarcity of longitudinal studies that adequately capture the long-term trajectories of aging with coexisting HIV and COPD, particularly in diverse populations across different geographic and socioeconomic contexts. Much of the existing literature is based on cross-sectional designs, which limit the ability to establish causal relationships and track disease progression over time. Additionally, many studies focus on single-disease models, thereby failing to account for the complex interactions between HIV, COPD, and other comorbid conditions such as cardiovascular disease, diabetes, and mental health disorders.[25] This fragmented approach restricts the development of integrated care strategies tailored to multimorbidity. Another significant limitation is the underrepresentation of older adults, women, and populations from low- and middle-income countries in clinical trials and epidemiological studies, leading to a lack of generalizability and potential bias in findings. Measurement variability also poses a challenge, as there is no universally accepted definition or standardized metrics for “successful aging” in the context of chronic illness, resulting in inconsistencies in outcome reporting and difficulty in comparing studies. Furthermore, reliance on self-reported data in many studies introduces recall bias and may not accurately reflect clinical realities. The heterogeneity of study populations, variations in diagnostic criteria, and differences in healthcare systems further complicate data interpretation. In terms of methodological rigor, small sample sizes, inadequate control groups, and limited use of advanced statistical models reduce the robustness of findings. There is also insufficient integration of interdisciplinary perspectives, with many studies neglecting psychosocial, behavioral, and environmental determinants that are crucial for understanding holistic aging. Emerging areas such as the role of the microbiome, genetic and epigenetic factors, and digital health interventions remain underexplored. Additionally, limited attention has been given to implementation science, which is essential for translating research findings into real-world clinical practice. Ethical



and cultural considerations are often inadequately addressed, particularly in studies involving vulnerable populations. Data from resource-limited settings are especially sparse, despite these regions bearing a significant burden of HIV and increasing rates of COPD due to environmental exposures. To address these gaps, there is a pressing need for well-designed, large-scale, longitudinal, and multidisciplinary studies that incorporate standardized definitions, diverse populations, and innovative methodologies. Strengthening research infrastructure, promoting global collaboration, and prioritizing patient-centered outcomes will be essential for advancing knowledge and improving care for individuals aging with HIV and COPD.[26]

## CONCLUSION

The successful aging in individuals living with Human Immunodeficiency Virus (HIV) and Chronic Obstructive Pulmonary Disease (COPD) represents a multifaceted and evolving paradigm that extends far beyond the traditional focus on disease control to encompass holistic well-being, functional independence, and quality of life. As advancements in antiretroviral therapy and respiratory care continue to prolong survival, there is a growing imperative to address the complex interplay of biological, psychological, and social determinants that shape the aging experience in this population. The coexistence of HIV and COPD introduces unique challenges, including chronic inflammation, immune dysregulation, accelerated aging, multimorbidity, and polypharmacy, all of which contribute to increased vulnerability and healthcare burden. These interconnected factors necessitate a shift from disease-centric models to integrated, patient-centered approaches that prioritize resilience, adaptability, and individualized care. The evidence underscores the importance of comprehensive care strategies that incorporate pharmacological management, lifestyle modifications such as nutrition and physical activity, mental health support, and rehabilitation interventions to enhance overall health outcomes. Equally critical is the role of nursing and allied health

professionals in delivering coordinated, multidisciplinary care that addresses not only clinical needs but also psychosocial and functional dimensions of health. Innovations in digital health and telemedicine offer promising opportunities to improve access to care, promote self-management, and facilitate continuous monitoring, particularly in underserved and resource-limited settings. However, achieving successful aging also requires addressing broader systemic factors, including social determinants of health, stigma, and healthcare inequities, which continue to disproportionately affect individuals living with HIV and COPD. Policy frameworks must evolve to support inclusive, equitable, and sustainable healthcare systems that recognize the needs of aging populations with chronic comorbidities. Ethical and legal considerations, including patient autonomy, confidentiality, and protection against discrimination, remain central to ensuring dignified and respectful care. Despite significant progress, substantial gaps persist in the current body of research, particularly in understanding long-term outcomes, developing standardized definitions of successful aging, and generating evidence from diverse populations and settings. Future research must adopt longitudinal, interdisciplinary, and patient-centered methodologies to better capture the complexity of aging with HIV and COPD and to inform targeted interventions. Furthermore, there is a need to strengthen global collaboration, enhance research capacity in low- and middle-income countries, and integrate emerging scientific insights, including precision medicine and digital health technologies, into clinical practice. Ultimately, successful aging in this population is not merely defined by the absence of disease or disability but by the ability to maintain meaningful engagement in life, preserve dignity, and achieve a sense of well-being despite ongoing health challenges. By embracing multidimensional perspectives and fostering innovation in care delivery, healthcare systems can better support individuals living with HIV and COPD in achieving optimal health outcomes and a higher quality of life across the aging continuum.

## REFERENCES

1. Yeganeh, S., & Sparkes, A. (2023). Ageing well with human immunodeficiency virus. *Pharmacy Practice and Research*, 53, 337–349.
2. Robinson, E., Perkins, M., & Bender, A. (2022). Factors that impact successful aging among older adults living with HIV/AIDS. *Innovation in Aging*, 6, 262–263.
3. Schmidt, C. W., Wegener, E. K., & Kayser, L. (2024). Needed competence for registered nurses working at a patient-centred telehealth service aimed to engage and empower people living with COPD: A five-month participatory observational study. *Applied Nursing Research*, 79, 151828.
4. Zdanowicz, M. M., Valdes, B., & Salani, D. (2024). Management of HIV in older adults: Clinical and public health challenge. *Public Health Nursing*, 41, 406–415.



5. Byanova, K. L., Abelman, R., North, C. M., Christenson, S. A., & Huang, L. (2023). COPD in people with HIV: Epidemiology, pathogenesis, management, and prevention strategies. *COPD: Journal of Chronic Obstructive Pulmonary Disease*, *18*, 2795–2817.
6. Antoniou, T., Yao, Z., Raboud, J., & Gershon, A. S. (2020). Incidence of chronic obstructive pulmonary disease in people with HIV in Ontario, 1996–2015: A retrospective population-based cohort study. *CMAJ Open*, *8*, E83–E89.
7. Zhang, C., Ji, G. Z., Poluektova, L. Y., Gorantla, S., & Dash, P. K. (2025). HIV and aging: Impacts on the central nervous system and insights from animal models. *ACS Infectious Diseases*, *11*, 2658–2670.
8. Rubtsova, A., Nash, P., & Vance, D. (2025). Psychosocial and emotional wellbeing of older adults with HIV. *Innovation in Aging*, *9*.
9. Thalia, O. P. (2024). The intersection of HIV and social determinants of health: A comprehensive review. *NIJRMS*, *5*, 53–58.
10. Yang, C., Teh, Y. E., Chua, N. G. S., Lee, K. L. S., & Ng, R. Q. M. (2023). An overview of multimorbidity and polypharmacy in older people living with HIV. *Geriatrics & Gerontology International*, *24*(Suppl. 1), 49–59.
11. Cadet, M. J. (2021). Antiretroviral therapies and corticosteroids: Drug–drug interactions. *The Nurse Practitioner*, *46*, 40–47.
12. Read, A., Akodu, J., Barber, T., Brown, J., Burns, F., Hurst, J., et al. (2025). Chronic obstructive pulmonary disease in people with HIV: An evidence-based review. *HIV Medicine*, *17*, 153–174.
13. Bennett, T., Walmsley, S., & Bendayan, R. (2025). Aging with HIV and HIV-associated neurocognitive impairment. *AIDS*, *39*, 215–228.
14. Thompson, L. W., & Steffen, A. M. (2021). Skills for brain health: Healthy cognitive aging. In *Oxford University Press* (pp. 181–200).
15. Chetty, L., Cobbing, S., & Chetty, V. (2020). Physical activity and exercise for older people living with HIV: A protocol for a scoping review. *Systematic Reviews*, *9*.
16. Sobue, Y., Suzuki, M., Ohashi, Y., Asai, S., & Imagama, S. (2025). Sarcopenia and inflammation, not disease activity, as determinants of nutritional risk in rheumatoid arthritis patients. *Annals of the Rheumatic Diseases*, *84*, 2053.
17. Sergeeva, V. A., & Bulgakova, S. V. (2025). Chronic obstructive pulmonary disease: Principles of treatment in elderly patients. *Advances in Gerontology*, *38*.
18. Stanly, E. A. R., Vilakkathala, R., & George, J. (2025). Medication non-adherence in older adults: Underlying factors, potential interventions and outcomes. *Drugs & Aging*, *42*.
19. Shin, J., Chang, Y.-P., Cameron, V., & Vance, D. (2025). Experiences of nursing care among older adults living with HIV. *Innovation in Aging*, *9*.
20. Rajagopalan, H., Prakash, P., Kumari, K., Chaudhary, L., & Tiwari, N. (2024). The role of physiotherapy in managing chronic respiratory conditions: A comprehensive review. *AJRID*, *15*, 1–6.
21. Kokorelias, K. M., Grosse, A., Zhabokritsky, A., & Sirisegaram, L. (2023). Understanding geriatric models of care for older adults living with HIV: A scoping review and qualitative analysis. *BMC Geriatrics*, *23*.
22. Kastner, A. (2025). Legal issues. In *Oxford University Press* (pp. 505–513).
23. Ruiz, E. L., Greene, K. Y., Galea, J. T., & Brown, B. (2022). From surviving to thriving: The current status of the behavioral, social, and psychological issues of aging with HIV. *Current Opinion in HIV and AIDS*, *17*, 55–64.
24. Gallucci, A., Trimarchi, P. D., Tuena, C., Cavedoni, S., Pedroli, E., Greco, F. R., et al. (2023). Technologies for frailty, comorbidity, and multimorbidity in older adults: A systematic review of research designs. *BMC Medical Research Methodology*, *23*.
25. Shiau, S., Bender, A. A., O'Halloran, J. A., Sundermann, E., Aggarwal, J., Althoff, K. N., et al. (2020). The current state of HIV and aging: Findings presented at the 10th international workshop on HIV and aging. *AIDS Research and Human Retroviruses*, *36*, 973–981.
26. Nyman, F. (2023). Health care of the disadvantaged: Chronic obstructive pulmonary disease in later life. *Frontiers in Public Health*, *11*.

