

Research progress on intrinsic capacity in elderly patients with chronic diseases



Review

Hu-Ping Gong, Minerva B. De Ala*

School of Nursing, The Philippine Women's University, Manila, Philippines

Received: 24 November 2025; Accepted: 5 January 2026; Published: 20 September 2026

Abstract Global aging underscores the need to address complex health challenges in elderly patients with chronic diseases. Intrinsic capacity (IC) provides a multidimensional framework covering cognitive, psychological, vitality, locomotion, and sensory domains. Among elderly patients with chronic conditions, IC plays a critical role in influencing both quality of life and clinical outcomes. Therefore, this article summarizes research progress on the current status of IC in elderly patients with chronic diseases.

Keywords: *chronic diseases • elderly • intrinsic capacity • review • research progress*

© Shanxi Medical Periodical Press.

1. Introduction

By 2050, over 2.1 billion people will be aged 60 years or older, comprising 22% of the global population.¹ Chronic diseases are the major health threats to the elderly,² thereby increasing the complexity of healthcare needs among older adults. In 2015, the World Health Organization (WHO) introduced the concept of “intrinsic capacity (IC),” defined as an individual’s composite ability across 5 domains: cognition, psychology, vitality, locomotion, and sensory capacity.³ This concept marks a shift from disease treatment alone to holistic functional maintenance. The WHO recommends initial screening across these 5 domains using a brief IC screening tool,⁴ followed by the application of domain-specific evaluation instruments for detailed measurement. Despite the growing variety of measurement tools, significant differences in indicators used across studies may limit the comparability of results.⁵

In recent years, IC has increasingly become a key indicator for predicting health outcomes in elderly

adults.⁶ Numerous studies have demonstrated that IC is closely associated with falls, quality of life, and mortality rates.^{7–9} IC is gradually providing new entry points for the long-term health management of elderly patients with chronic diseases.¹⁰ Therefore, analyzing the status and determinants of IC in elderly patients with chronic diseases is key to promoting healthy aging.

2. Intrinsic capability of elderly patients with single chronic disease

Elderly patients with chronic diseases show heterogeneous patterns of IC decline across different disease types. For instance, a study of 701 elderly individuals with cardiovascular disease showed that they had lower baseline IC levels compared to the general community-dwelling elderly population.¹¹ This may be attributed to

How to cite this article: Gong HP, De Al MB. Research progress on intrinsic capacity in elderly patients with chronic diseases. *Front Nurs*. 2026;3:291–296.

*Corresponding author.

E-mail: mdeala@pwu.edu.ph (MB. De Ala).

Open Access. © 2026 Gong and De Ala, published by Shanxi Medical Periodical Press. This work is licensed under the Creative Commons Attribution 4.0 License.

the pathological and physiological burdens of the disease. Among elderly stroke patients in the recovery phase, overall IC tends to be at a moderately low level, particularly in the cognitive dimension.¹² It was found similarly among elderly patients with coronary heart disease.¹³ Additionally, research on elderly hypertensive patients indicates a general decline in IC, involving multidimensional simultaneous impairment.¹⁴ In summary, elderly patients with common chronic diseases such as stroke, coronary heart disease, and hypertension generally exhibit moderate to low levels of IC, often in a state of decline. This decline is multifaceted. A study of 240 elderly patients with type 2 diabetes found that the overall incidence of IC decline was 47.5%, with particular deterioration in the cognitive and psychological domains.¹⁵ This may be related to age and diabetes-related complications, both of which are risk factors for reduced IC.¹⁶ Elderly patients undergoing hemodialysis also commonly experience significant IC decline, particularly affecting vitality, locomotion, and psychological dimensions.¹⁷ This is related to the fact that these patients commonly face physical functional decline, such as sarcopenia, reduced mobility, malnutrition, and a state of low-grade inflammation. These factors exacerbate the overall IC decline.^{18–20} A comparable decline has been noted among elderly cancer patients receiving chemotherapy.²¹ Elderly adults with a single chronic disease commonly experience different impairments in IC. Therefore, incorporating IC assessment into the management of elderly patients with chronic conditions is essential. Such assessments can support the development of individualized care plans, particularly for the most frequently affected cognitive, psychological, and vitality domains. Future research should prioritize longitudinal studies to better understand IC trajectories and causal mechanisms, to develop disease-specific intervention measures.

3. Intrinsic capability of elderly patients with multiple chronic conditions

Multiple chronic conditions (MCCs) are highly prevalent among older adults and have a pronounced cumulative adverse effect on functional independence.²² Furthermore, interactions between different diseases can amplify their collective negative impact on IC. Increased treatment burdens and complex medication regimens further undermine patients' capacity to maintain function.²³ Research indicates a clear relationship between MCCs and IC in older adults. Arthritis-gastritis or respiratory system diseases have a more significant negative impact on IC. This may be due to associated factors,

such as chronic pain, systemic inflammation, limited mobility, and nutritional risks.²⁴ However, existing studies have limitations. For instance, some important age-related conditions such as osteoporosis, were not included in certain analyses. Further analysis reveals that different disease combination patterns variably affect IC, contributing to its multi-dimensional deterioration.^{24,25} For example, among community-dwelling elderly diabetes patients with multimorbidity, sensory impairment is the most prominent (37.1%), often associated with diabetic retinopathy and hearing loss. Locomotion impairment affects 26.3% of patients and is frequently linked to reduced muscle strength and balance.²⁶ In summary, MCCs significantly aggravate multidimensional impairment IC in the elderly, with distinct patterns based on disease combinations. Based on these findings, healthcare providers should implement structured IC assessments in geriatric clinics to identify high-risk patients early. Subsequently, integrated care models tailored to specific disease combination patterns should be developed to address the holistic functional needs of this population.

4. The impact of IC on health outcomes in elderly patients with chronic disease

The level of IC directly influences disease progression and key health outcomes in elderly patients with chronic disease. These outcomes include functional limitations, falls, disability, and hospitalization rates.^{27–29} For example, patients with osteoporosis are more likely to experience activity limitations and have an increased risk of falls.³⁰ Similarly, stroke survivors frequently exhibit cognitive impairment and multidimensional functional limitations.³¹ Overall, patients with chronic disease are particularly susceptible to insufficient IC. This insufficiency often leads to a substantial increase in healthcare resource consumption.²⁴ More critically, the decline in IC is a significant predictor of all-cause mortality and cardiovascular mortality among elderly patients with chronic disease.^{11,32,33} In summary, the deterioration of IC in this population worsens their quality of life and amplifies the overall disease burden. While these observational studies are valuable for establishing association, their inherent design limits their capacity to definitively establish causality between IC decline and subsequent health outcomes. Therefore, dynamic monitoring and targeted intervention for IC should be prioritized in chronic disease management. The primary goal should be to design and evaluate effective integrated care models aimed at mitigating IC decline and its consequential impact on health outcomes.³⁴

5. Factors influencing IC in elderly patients with chronic disease

The decline of IC arises from complex interactions among physiological, psychological, and social factors. In elderly patients with chronic disease, this process is often accelerated by the pathological progression of the disease, the cumulative effects of comorbidities, and the burdens associated with treatment.

5.1. Physiological factors

Physiological factors constitute the core foundation influencing IC. Inflammatory responses,³⁵ oxidative stress,³⁶ metabolic disorders,³⁷ and impaired neurological function³⁸ related to chronic diseases can directly contribute to the decline of IC. For instance, patients with chronic kidney disease frequently experience reduced muscle mass and strength due to chronic inflammation, manifesting as decreased physical strength and vitality.³⁹ Research indicates that the level of brain-derived neurotrophic factor (BDNF) at the neuromuscular junction is positively correlated with IC. Higher BDNF levels are associated with a lower risk of IC impairment. Furthermore, oxidative stress has been identified as a partial mediator in the protective mechanism of BDNF against IC decline.³⁶ Additionally, comorbidity and polypharmacy can trigger drug interactions and adverse reactions, thereby diminishing patients' functional reserves.⁴⁰ However, it is important to note that evidence for many specific mechanisms often derives from cross-sectional or case-control studies. Future research should employ longitudinal designs with repeated measures of both biomarkers and IC to better elucidate causal pathways. Consensus-building efforts are also needed to standardize core biomarker panels.

5.2. Psychological factors

Psychological factors significantly influence the maintenance of IC. Elderly patients with chronic diseases experience depression, increased cognitive burden, and diminished self-efficacy.⁴¹ Depression accelerates memory decline, while memory decline exacerbates depression.⁴² It also found that middle-aged and elderly diabetes patients with low self-efficacy levels often lack confidence in adhering to medication regimens and monitoring blood glucose levels, indirectly accelerating functional decline.⁴³ The research is strengthened by the use of validated psychometric scales, yet it is limited by its heavy reliance on self-report, which can be influenced by cultural and cognitive biases.⁴² Moreover, many studies focus on single psychological constructs,

potentially overlooking synergistic effects, such as those between depression and low self-efficacy. Therefore, integrating standardized psychological screening into chronic disease management and providing targeted psychological support are crucial for maintaining IC in this population.

5.3. Social factors

Social factors provide essential external support for maintaining IC. They influence IC through pathways such as promoting activity participation, strengthening family relationships, providing social support, and determining economic status.^{11,44} Social environment and lifestyle play crucial roles, particularly in resource-poor areas and among populations with weak social support systems, where the risk of IC decline is significantly heightened. High levels of education and economic wealth can foster healthy lifestyles and encourage active social engagement, thereby enhancing quality of life and delaying IC decline.^{11,45} However, it is difficult to disentangle whether social factors directly preserve IC or are proxies for other advantages like better nutrition and earlier access to healthcare. For policymakers, it is vital to fund community-based programs that reduce social isolation and develop social care policies that actively support the functional well-being of older adults with chronic conditions.

6. Conclusions

IC significantly influences both the quality of life and clinical outcomes in elderly patients with chronic diseases. The factors affecting IC include physiological, psychological, and social dimensions. Although this study provides an overview of the current understanding of IC in elderly adults with chronic diseases, the existing evidence base remains relatively limited. Studies to date vary widely in research design and different chronic disease populations, making it challenging to draw definitive conclusions. Future research should prioritize longitudinal and interventional studies to elucidate the characteristics and trajectories of IC in this population. Expanding high-quality evidence in this area will be essential for advancing the practical integration of IC into clinical assessment and intervention strategies.

Ethical approval

Ethical issues are not involved in this paper.

Conflicts of interest

All contributing authors declare no conflicts of interest.

References

1. Organization WH. Ageing and health. <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>. Accessed August 23, 2025.
2. GBD 2019 Diseases and Injuries Collaborators. Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: A systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020;396(10258):1204–1222.
3. Organization WH. World report on ageing and health. <https://iris.who.int/handle/10665/186463>. Accessed August 23, 2025.
4. Organization WH. Integrated care for older people (ICOPE): guidance for person-centred assessment and pathways in primary care. <https://www.who.int/publications/i/item/9789240103726>. Accessed August 23, 2025.
5. George PP, Lun P, Ong S, Lim WS. A rapid review of the measurement of intrinsic capacity in older adults. *J Nutr Health Aging*. 2021;25:774–782.
6. Grigoraş G, Ilie AC, Turcu AM, et al. Resilience and intrinsic capacity in older adults: a review of recent literature. *J Clin Med*. 2025;14:7729.
7. Shen S, Xie Y, Zeng X, et al. Associations of intrinsic capacity, fall risk and frailty in old inpatients. *Front Public Health*. 2023;11:1177812.
8. Sánchez-Sánchez JL, Lu WH, Gallardo-Gómez D, et al. Association of intrinsic capacity with functional decline and mortality in older adults: a systematic review and meta-analysis of longitudinal studies. *Lancet Healthy Longev*. 2024;5:e480–e492.
9. Yu J, Jin Y, Si H, et al. Relationship between intrinsic capacity and health-related quality of life among community-dwelling older adults: the moderating role of social support. *Qual Life Res*. 2024;33:267–280.
10. Bernal MC, Batista E, Martínez-Ballesté A, Solanas A. A functional approach to model intrinsic capacity in ageing trajectories. *Sci Rep*. 2025;15:7878.
11. Cui Y, Lei S, Xia Y, Yang F. The trajectory of intrinsic capacity and its related factors among elderly Chinese patients with cardiovascular disease: a prospective cohort study. *Front Endocrinol (Lausanne)*. 2025;16:1539982.
12. Li J, Huang F, Wang YJ, Zhou J. Current status and influencing factors of intrinsic capacity in elderly stroke patients during recovery period. *J Bingtuan Med*. 2023;21:10–13 (in Chinese).
13. Ji S. *Study on Intrinsic Capacity Status and Its Influencing Factors in Elderly Patients With Coronary Heart Disease*. Yangzhou: Yangzhou University; 2024 (in Chinese).
14. Huang B, Luo T, Jiang X. Correlation between decline in intrinsic capacity and blood pressure variability in elderly patients with hypertension. *Chin J Geriatr Heart Brain Vessel Dis*. 2022;24:709–712 (in Chinese).
15. Shi J. *Analysis of Risk Factors for Decreased Intrinsic Capacity in Elderly Patients With Type 2 Diabetes Mellitus*. Xining: Qinghai University; 2023 (in Chinese).
16. Al-Rubeaan K, AlMomani M, AlGethami AK, et al. Hearing loss among patients with type 2 diabetes mellitus: a cross-sectional study. *Ann Saudi Med*. 2021;41:171–178.
17. Yan X, Li M, Pan M, Zhang L. Analysis of status and influencing factors of intrinsic capacity in elderly patients receiving maintenance hemodialysis. *Pract Geriatr*. 2024;38:541–544.
18. Sá Martins V, Aguiar L, Dias C, et al. Predictors of nutritional and inflammation risk in hemodialysis patients. *Clin Nutr*. 2020;39:1878–1884.
19. Damanti S, Rovere-Querini P. Early recognition and prompt treatment of acute sarcopenia: impact on short-and long-term outcomes. *J Frailty Aging*. 2025;14:S171.
20. Ntsama Essomba MJ, Andela Ebidiye JK, Noubiap JJ, Motto Ndoumbe J, Djuikwo Teukeng F, Teguo TM. Prevalence of intrinsic capacity impairment and associated factors among retired older people in Cameroon. *BMC Geriatr*. 2025;25:1–9.
21. Li S, Zhu K, Xia C, Yang L, Duan P. Latent class analysis and influencing factors of intrinsic capacity in elderly cancer patients undergoing chemotherapy. *Chin Nurs Manag*. 2025;25:219–225 (in Chinese).
22. Singh B, Kumar A. Ageing, multimorbidity, and quality of life: a mediation analysis using longitudinal ageing study in India. *Front Public Health*. 2025;13:1562479.
23. Foley L, Hynes L, Murphy AW, Molloy GJ. Just keep taking them, keep hoping they'll work': a qualitative study of adhering to medications for multimorbidity. *Br J Health Psychol*. 2022;27:691–715.
24. Zhang M, Xu Y, Xing Y, Li H. Association between multimorbidity and intrinsic capacity among older Chinese adults: evidence from the CHARLS 2011-2015. *Eur Geriatr Med*. 2025;16:1207–1216.
25. Zhao J, Chhetri JK, Chang Y, Zheng Z, Ma L, Chan P. Intrinsic capacity vs. multimorbidity: a function-centered construct predicts disability better than a disease-based approach in a

- community-dwelling older population cohort. *Front Med (Lausanne)*. 2021;8:753295.
26. Zhou B, Ma R, Lu M, Wang Y. Latent class analysis of intrinsic capacity among community-dwelling elderly diabetes mellitus patients with multimorbidity. *J Nurs Sci*. 2025;40:6–11.
 27. Yu J, Si H, Qiao X, et al. Predictive value of intrinsic capacity on adverse outcomes among community-dwelling older adults. *Geriatr Nurs*. 2021;42:1257–1263.
 28. Zhou J, Chang H, Leng M, Wang Z. Intrinsic capacity to predict future adverse health outcomes in older adults: a scoping review. *Healthcare (Basel)*. 2023;11:450.
 29. Lu F, Liu S, Liu X, et al. Comparison of the predictive value of intrinsic capacity and comorbidity on adverse health outcome in community-dwelling older adults. *Geriatr Nurs*. 2023;50:222–226.
 30. Azevedo DC, Hoff LS, Kowalski SC, de Andrade CAF, Trevisani VFM, de Melo AKG. Risk factors for osteoporotic hip fracture among community-dwelling older adults: a real-world evidence study. *Adv Rheumatol*. 2024;64:8.
 31. Zhu L, Shen X, Shi X, Ouyang X. Factors associated with intrinsic capacity impairment in hospitalized older adults: a latent class analysis. *BMC Geriatr*. 2024;24:494.
 32. Ramírez-Vélez R, Iriarte-Fernández M, Santafé G, et al. Association of intrinsic capacity with incidence and mortality of cardiovascular disease: prospective study in UK Biobank. *J Cachexia Sarcopenia Muscle*. 2023;14:2054–2063.
 33. Zeng X, Guan H, Wang Y, Shen S. Declined intrinsic capacity is associated with one-year functional disability in older hypertensive inpatients. *BMC Geriatr*. 2025;25:649.
 34. Jayaraj V, Gnanasekaran S, Vb Y, Mohanraj PS, Rajendran N, Dutta G, et al. Estimating the prevalence of intrinsic capacity decline: a systematic review and meta-analysis using WHO's integrated care of older people (ICOPE) screening tool. *Archi Gerontol Geriatr Plus*. 2024;1:10032.
 35. Li X, Ma L. From biological aging to functional decline: insights into chronic inflammation and intrinsic capacity. *Ageing Res Rev*. 2024;93:102175.
 36. Zhang C, Zeng P, Zhang Y, et al. Cross-sectional association between brain-derived neurotrophic factor and intrinsic capacity in older adults: the mediating role of oxidative stress. *J Nutr Health Aging*. 2025;29:100599.
 37. Pan Y, Liu P, Li Y, Ma L. Abnormalities in the citrate cycle metabolism are associated with declined intrinsic capacity in older adults. *Innov Aging*. 2022;6(suppl_1):325–326.
 38. Benito-León J, Papaliagkas V. Cognitive impairment in neurological diseases. *Int J Mol Sci*. 2024;25:4435.
 39. Watson EL, Baker LA, Wilkinson TJ, et al. Inflammation and physical dysfunction: responses to moderate intensity exercise in chronic kidney disease. *Nephrol Dial Transplant*. 2022;37:860–868.
 40. Liu H, Zhang X, Chen B, Fang B, Lou VW, Hu J. The differential impact of multimorbidity patterns and subsequent accumulation on longitudinal trajectories of physical function decline in a population-based cohort of older people. *J Gerontol A Biol Sci Med Sci*. 2022;77:1629–1636.
 41. Jiakponna EC, Agbomola JO, Ipede O, et al. Psychosocial factors in chronic disease management: implications for health psychology. *Int J Sci Res Arch*. 2024;12:117–128.
 42. Yin J, John A, Cadar D. Bidirectional associations of depressive symptoms and cognitive function over time. *JAMA Netw Open*. 2024;7:e2416305–e2416305.
 43. AlShezawi IA, Rawwad THA, Aldirawi AA, Alwawi AA, Fazari HSA, Shah AH. Exploring the impact of self-efficacy on glycemic control in Omani type 2 diabetes patients. *Front Endocrinol (Lausanne)*. 2025;16:1597274.
 44. Zheng X, Xue Y, Dong F, et al. The association between health-promoting-lifestyles, and socioeconomic, family relationships, social support, health-related quality of life among older adults in China: a cross sectional study. *Health Qual Life Outcomes*. 2022;20:64.
 45. Huang Z-T, Lai ET, Luo Y, Woo J. Social determinants of intrinsic capacity: a systematic review of observational studies. *Ageing Res Rev*. 2024;95:102239.