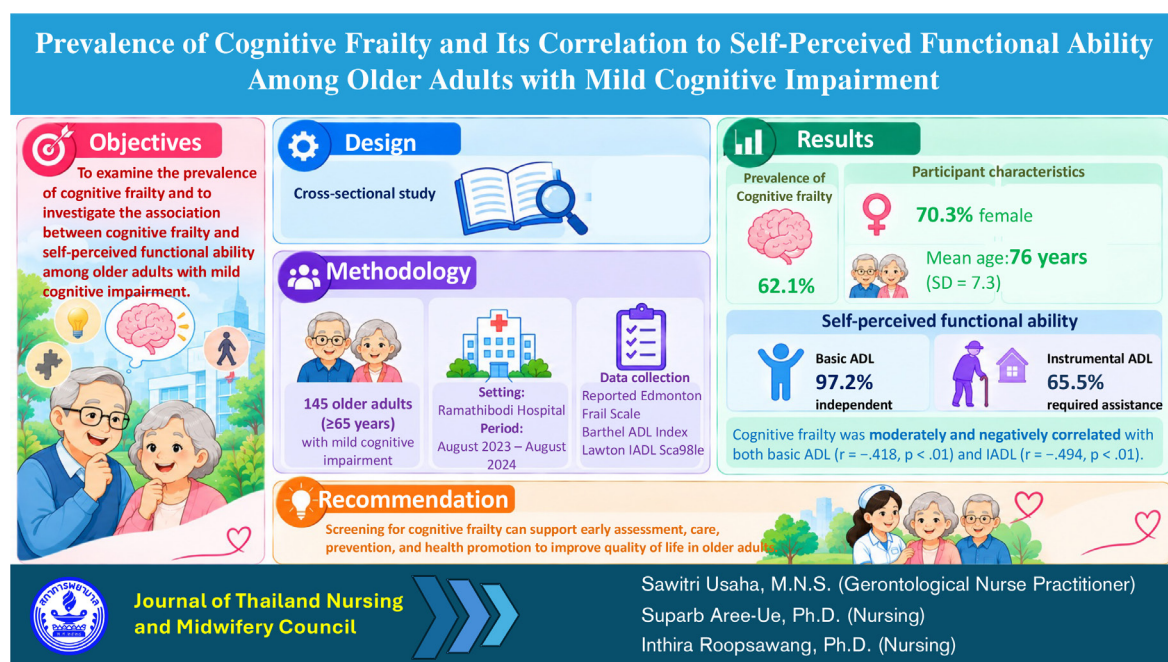


Prevalence of Cognitive Frailty and Its Correlation to Self-Perceived Functional Ability Among Older Adults with Mild Cognitive Impairment¹

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Extended Abstract

Introduction Cognitive frailty (CF) refers to the co-occurrence of physical frailty and mild cognitive impairment (MCI), which shares common pathological mechanisms. It is associated with multiple factors, including inflammation, impaired nutrition, vascular integrity, metabolic dysregulation, oxidative stress, cellular senescence, mitochondrial dysfunction, hypothalamic-pituitary axis dysregulation, metabolic imbalance, and neuroendocrine dysfunction. Cognitive frailty complicates health care management and constitutes a risk factor for progression to dementia. Moreover, it is

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*Prevalence of Cognitive Frailty and Its Correlation to Self-Perceived Functional Ability
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linked to adverse health outcomes among older adults, such as falls, dependency or disability, hospitalization, dementia, reduced quality of life, and increased mortality. Currently, evidence regarding the association between cognitive frailty and functional ability in both basic activities of daily living (ADL) and instrumental activities of daily living (IADL) remains limited, with most studies focusing on community-dwelling older adults. Furthermore, there is a lack of research exploring cognitive frailty among older adults with mild cognitive impairment in hospital settings. As aging may accelerate the progression of both cognitive frailty and chronic diseases, early identification of cognitive frailty during hospital visits and follow-up could provide valuable insights for promoting health and quality of life in this population.

Objectives This study aims to examine the prevalence of cognitive frailty and to investigate the association between cognitive frailty and self-perceived functional ability among older adults with mild cognitive impairment.

Design This cross-sectional study was conducted based on a conceptual framework developed by the researcher through a comprehensive review of the literature.

Methodology The study participants comprised 145 older adults aged 65 years and above who had been diagnosed with mild cognitive impairment and received services at the Outpatient Department of Ramathibodi Hospital during August 2023 to August 2024. Participants were purposively selected based on the following inclusion criteria: 1) diagnosed with mild cognitive impairment by a specialist physician, without clinical manifestations of dementia, and 2) no hearing or visual impairment, with the ability to understand and communicate in Thai. The exclusion criteria were a diagnosis of Alzheimer's disease, dementia, or current psychiatric treatment. Data were collected through structured interviews using questionnaires consisting of: 1) a personal information interview form, 2) the Thai version of the Reported Edmonton Frail Scale, 3) The Barthel Activity Daily Living Index, assessing basic activities of daily living (ADL), and 4) The Lawton Instrumental Activity of Daily Living Scale, assessing instrumental activities of daily living (IADL). Data were analyzed using descriptive statistics and Spearman's rank correlation coefficient.

Results The majority of participants were female (70.3%), aged between 65 and 96 years, with a mean age of 76 years ($SD = 7.3$). Most were married (69.7%). The highest level of education attained was a bachelor's degree (31.7%), followed by primary education (27.6%). The prevalence of cognitive frailty was 62.1%. Regarding self-perceived functional ability, most participants were able to perform basic activities of daily living (ADLs) independently (97.2%), while 65.5% required assistance with instrumental activities of daily living (IADLs). Spearman's correlation analysis revealed that cognitive frailty was moderately and negatively correlated with both basic ADL performance ($r_s = -.418, p < .01$) and IADL performance ($r_s = -.494, p < .01$).

Recommendation The findings of this study highlight the importance of screening for cognitive frailty. Health care teams may apply these results to improve the efficiency of public health services in screening, assessment, care, prevention, and health promotion, thereby enhancing the quality of life for older adults.

Keywords cognitive frailty / functional ability / mild cognitive impairment

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ความชุกของภาวะเปราะบางด้านการรู้คิดและความสัมพันธ์กับการรับรู้ ความสามารถในการทำหน้าที่ของผู้สูงอายุที่มีภาวะการรู้คิดบกพร่องเล็กน้อย¹

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บทคัดย่อขยาย

บทนำ ภาวะเปราะบางด้านการรู้คิด คือการมีภาวะเปราะบางทางกาย ร่วมกับภาวะการรู้คิดบกพร่องเล็กน้อยซึ่งมีกลไกการเกิดพยาธิวิทยาาร่วมกัน มีความเกี่ยวข้องกับปัจจัยต่าง ๆ เช่น การอักเสบ ภาวะโภชนาการบกพร่อง ความสมบูรณ์ของหลอดเลือดที่บกพร่อง การทำงานผิดปกติของการเผาผลาญ ความเครียดออกซิเดชัน การแก่ตัวของเซลล์ ความบกพร่องของไมโทคอนเดรีย ความผิดปกติของแกนไฮโปทาลามัส-พิทูอิทารี ความไม่สมดุลของเมแทบอลิซึม และความผิดปกติของระบบประสาทและต่อมไร้ท่อ ภาวะเปราะบางด้านการรู้คิด เพิ่มความซับซ้อนในการดูแลสุขภาพและเป็นปัจจัยเสี่ยงต่อการพัฒนาไปสู่ภาวะสมองเสื่อม นอกจากนี้ภาวะเปราะบางด้านการรู้คิด ยังมีความสัมพันธ์กับการเกิดผลลัพธ์ด้านสุขภาพที่ไม่พึงประสงค์ ในผู้สูงอายุ ได้แก่ การหกล้ม ภาวะการพึ่งพิงหรือทุพพลภาพ การเข้ารับการรักษาในโรงพยาบาล ภาวะสมองเสื่อม คุณภาพชีวิต และอัตราการเสียชีวิต ปัจจุบันยังมีข้อมูลจำกัดเกี่ยวกับความสัมพันธ์ระหว่างภาวะเปราะบางด้านการรู้คิด กับความสามารถในการทำกิจวัตรประจำวัน ทั้งในระดับพื้นฐาน และกิจกรรมเชิงซับซ้อน โดยงานวิจัยส่วนใหญ่เน้นศึกษาผู้สูงอายุที่อาศัยอยู่ในชุมชน นอกจากนี้ ยังขาดหลักฐานที่สำรวจภาวะเปราะบางด้านการรู้คิดในผู้สูงอายุที่มีภาวะบกพร่องด้านการรู้คิดเล็กน้อยในบริบทโรงพยาบาล ซึ่งกระบวนการสูงวัยอาจเร่งการดำเนินโรคทั้งภาวะเปราะบางด้านการรู้คิดและโรคเรื้อรัง การระบุภาวะเปราะบางด้านการรู้คิดได้ตั้งแต่ระยะเริ่มต้นระหว่างการเข้ารับการรักษาและการติดตามผล จึงอาจให้ข้อมูลเชิงลึกเพื่อส่งเสริมสุขภาพและคุณภาพชีวิตของผู้สูงอายุในกลุ่มนี้

วัตถุประสงค์ การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อ ศึกษาความชุกของภาวะเปราะบางด้านการรู้คิดและความสัมพันธ์ระหว่างภาวะเปราะบางด้านการรู้คิดกับการรับรู้ความสามารถในการทำหน้าที่ของผู้สูงอายุที่มีภาวะการรู้คิดบกพร่องเล็กน้อย

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การออกแบบวิจัย การศึกษาแบบภาคตัดขวาง ผู้วิจัยพัฒนารอบแนวคิดของการศึกษาจากการทบทวนวรรณกรรม

วิธีดำเนินการวิจัย กลุ่มตัวอย่างเป็นผู้สูงอายุตั้งแต่ 65 ปีขึ้นไป ที่ได้รับการวินิจฉัยว่ามีภาวะการรู้คิดบกพร่องเล็กน้อย มารับบริการในแผนกหน่วยตรวจผู้ป่วยนอกของโรงพยาบาลรามธิบดี ในช่วงเดือนสิงหาคม 2566 เดือนสิงหาคม 2567 จำนวน 145 คน คัดเลือกแบบเฉพาะเจาะจง โดยผ่านเกณฑ์คัดเข้า คือ 1) ได้รับการวินิจฉัยว่ามีภาวะบกพร่องด้านการรู้คิดเล็กน้อยโดยแพทย์ผู้เชี่ยวชาญ แต่ไม่มีอาการทางคลินิกของภาวะสมองเสื่อม และ 2) ไม่มีการสูญเสียการได้ยินหรือการมองเห็น และสามารถเข้าใจและสื่อสารด้วยภาษาไทย เกณฑ์คัดออกคือ ได้รับการวินิจฉัยโรคอัลไซเมอร์ ภาวะสมองเสื่อมหรือได้รับการรักษาอาการทางจิตเวช เก็บรวบรวมข้อมูลโดยการสัมภาษณ์แบบมีโครงสร้างด้วยแบบสอบถามประกอบด้วย 1) แบบสัมภาษณ์ข้อมูลส่วนบุคคล 2) แบบประเมินภาวะเปราะบางแอดมอนทัสฉบับภาษาไทย 3) แบบประเมินความสามารถในการทำกิจวัตรประจำวันขั้นพื้นฐาน และ 4) แบบประเมินความสามารถในการทำกิจวัตรประจำวันขั้นซับซ้อน วิเคราะห์ข้อมูลด้วยสถิติบรรยาย และสัมประสิทธิ์สหสัมพันธ์ของสเปียร์แมน

ผลการวิจัย กลุ่มตัวอย่างส่วนใหญ่เป็นเพศหญิง (ร้อยละ 70.3) มีอายุระหว่าง 65 – 96 ปี อายุเฉลี่ย 76 ปี (SD = 7.3) สถานภาพสมรสคู่ (ร้อยละ 69.7) จบการศึกษาในระดับปริญญาตรีมากที่สุด (ร้อยละ 31.7) รองลงมาคือ ระดับประถมศึกษา (ร้อยละ 27.6) มีภาวะเปราะบางด้านการรู้คิด (Cognitive frailty) ร้อยละ 62.1 การรับรู้ความสามารถในการทำหน้าที่ของผู้สูงอายุ พบว่ากลุ่มตัวอย่างส่วนใหญ่สามารถทำกิจวัตรประจำวันขั้นพื้นฐาน (ADLs) ได้อย่างอิสระ ร้อยละ 97.2 และต้องการความช่วยเหลือในการปฏิบัติกิจวัตรประจำวันขั้นซับซ้อน (IADLs) ร้อยละ 65.5 ผลของการวิเคราะห์ความสัมพันธ์โดยใช้สถิติสหสัมพันธ์แบบสเปียร์แมน พบว่าภาวะเปราะบางด้านการรู้คิดมีความสัมพันธ์ทางลบในระดับปานกลางกับความสามารถในการทำกิจวัตรประจำวันขั้นพื้นฐาน ($r_s = -.418, p < .01$) และความสามารถในการทำกิจวัตรประจำวันขั้นซับซ้อน ($r_s = -.494, p < .01$)

ข้อเสนอแนะ ผลการศึกษานี้แสดงให้เห็นถึงความสำคัญในการคัดกรองภาวะเปราะบางด้านการรู้คิด ทีมสุขภาพสามารถนำผลการศึกษานี้ไปประยุกต์ใช้ในการเพิ่มประสิทธิภาพของระบบบริการสาธารณสุข ด้านการคัดกรอง ประเมินผล การดูแล ป้องกัน ส่งเสริมสุขภาพและคุณภาพชีวิตของผู้สูงอายุ

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คำสำคัญ ภาวะเปราะบางด้านการรู้คิด/ ความสามารถในการทำหน้าที่/ภาวะการรู้คิดบกพร่องเล็กน้อย/ ผู้สูงอายุ

วันที่ได้รับ 11 พ.ย. 68 วันที่แก้ไขบทความเสร็จ 12 พ.ค. 69 วันที่รับตีพิมพ์ 25 พ.ค. 69

Introduction

Aging processes result from molecular and cellular deterioration as people age, affecting physical and mental abilities and increasing the risk of disease and death.¹ Older adults may experience several complex health problems called geriatric syndromes. Frailty is characterized as a transitional state from strength to vulnerability that affects multiple dimensions of health, including physical, cognitive, mental, and social dimensions, and influences the alteration of many body functions such as the nervous and brain system, endocrine system, respiratory system, cardiovascular system, and muscle, and bone and joint systems.² Physical frailty is a specific type of frailty that can lead to negative health consequences, including falls, bone fractures, disability, dementia, hospitalization, and death.³

Physical frailty and mild cognitive impairment share underlying mechanisms, including inflammation, nutrition, vascular integrity, metabolic dysregulation, oxidative stress, cellular senescence, mitochondrial dysfunction, hypothalamic-pituitary axis dysregulation, energy metabolism imbalances, and neuroendocrine abnormalities.³⁻⁴ Thus, once physical frailty develops, it may pervade other systems, making it more difficult to manage and leading to more profound health consequences. The International Academy on Nutrition and Aging (IANA) and the International Association of Gerontology and Geriatrics (IAGG) define this phenomenon as cognitive frailty (CF), excluding concurrent Alzheimer's disease or other types of dementia. Cognitive frailty is a condition potentially caused by the aging process, characterized by the concurrent presentation of two major symptoms: physical frailty and mild cognitive impairment that is neither caused nor associated with dementia.⁵ Cognitive frailty can be categorized into two subtypes: potentially reversible cognitive frailty and irreversible cognitive frailty.⁶

The prevalence of cognitive frailty varies across settings, ranging from 1.6% to 39.3% in community settings, 5.4% in hospital settings, and 10.3% in nursing homes.⁷ In Thailand, a previous study explored the cognitive frailty among community-dwelling older adults with knee osteoarthritis in four provinces: Phayao, Mukdahan, Ranong, and Ang Thong, revealing a prevalence of 2.44%.⁸ Later, in 2020, a study conducted in clinical settings across three outpatient departments in Bangkok found a prevalence of 6.7%.⁹ Additionally, a study carried out in 2021 involving older adults residing in communities in Chiang Mai reported a prevalence of 28.7%.¹⁰ These findings highlight variations in prevalence based on different environments and individual factors, as well as variations among the cognitive frailty assessment tools used.

A review of several studies found that the prevalence of cognitive frailty increases with age. Previous systematic reviews and meta-analyses have indicated that older adults with cognitive frailty typically start at age 65, with a mean age of 74.1 ± 5.2 years.⁷ Advanced age is associated with a 1.13-times higher risk of developing cognitive frailty (OR = 1.13; 95%CI 1.00 – 1.28).¹¹ Some studies suggested that older adults aged 75 have a five-fold higher risk of developing cognitive frailty (OR = 4.9; 95%CI 1.84 – 13.10),¹² while those aged 80 have a risk that is 20 times higher than those who are younger (OR = 19.71; 95%CI 13.49–28.79).³

Evidence from previous studies show the cognitive frailty affects the adverse health outcomes of older adults, including falls,¹³ dependency or disability,¹⁴⁻¹⁵ hospitalization,¹⁵ dementia,¹⁵⁻¹⁶ quality of life, and mortality.¹⁵⁻¹⁷ A prior systematic review and meta-analysis showed that older adults with cognitive frailty

have a 1.82-fold higher incidence of falls (OR = 1.82; 95%CI 1.29–2.58). This evaluation used the Basic Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) scales to evaluate dependency or disability. Additionally, older adults with cognitive frailty were found to be 1.4 times more likely to experience impairments in basic daily living (OR = 1.41; 95% CI 1.15 – 1.74) and 2.43 times more likely to face instrumental daily living impairment and disability (OR = 2.43; 95% CI 1.64–3.62). They were also 3.17 times more likely to be hospitalized (OR = 3.17; 95% CI 2.24–4.48) and had a 1.67-fold increased risk of hospitalization (OR = 1.67; 95% CI 0.83–3.36).¹⁸ Furthermore, the risk of developing dementia was 3.67 times higher (OR = 3.67; 95%CI 2.81–4.78). A study of older people in Singapore, using the Short Form-12 Survey, found that those with cognitive frailty experienced a 5.34-fold reduction in quality of life (OR= 5.34; 95% CI 2.42–11.7). Long-term follow-up revealed that the impact on quality of life was 26 times.¹⁹

Currently, little is known about the association between cognitive frailty and perceived functional ability in both basic and instrumental activities of daily living (ADL and IADL). However, most studies have been conducted on older people living in the community, and research on cognitive frailty and its prevalence remains limited. This underscores the need for more extensive studies to enhance understanding of this condition. There is a dearth of evidence regarding exploring cognitive frailty in older adults with mild cognitive impairment in hospital settings. As the aging process may accelerate the prognosis of both CF and chronic diseases, early identification of cognitive frailty during hospital visits and follow-up could provide insights for promoting health and well-being in

this population. There is a paucity of published studies examining the impact of cognitive frailty on functional ability, particularly within the Thai context. Results from this study can guide healthcare teams to move beyond merely identifying cognitive frailty to actively prevent decline, improve functional ability, and ultimately enhance equity and quality of care for this vulnerable population.

Objectives

1) To examine the prevalence of cognitive frailty of older adults with mild cognitive impairment undergoing services at the Outpatient Departments of a Tertiary care hospital

2) To investigate the association between cognitive frailty and self-perceived functional ability among older adults with mild cognitive impairment undergoing services at the Outpatient Departments of a Tertiary care hospital

Conceptual framework

The conceptual framework for this study was based on a literature review of cognitive frailty. Frailty is one of the common geriatric syndromes in older adults. It commonly refers to physical frailty, specifically to a decline in body energy reserves and the ability to respond to various stressors. In doing so, frailty results from pathophysiological alterations associated with aging. Evidence reveals that frailty involves various biological, behavioral, environmental, and social factors that influence the functioning of multiple body systems, including the endocrine, respiratory, cardiovascular, musculoskeletal, and joint systems,² and adverse health outcomes, disability/physical impairment, morbidity, falls, and hospitalization.²⁰

Mild cognitive impairment (MCI) is a transitional stage between normal aging and dementia. Individuals with MCI can still perform daily activities, but they

may lose their executive function or may require more effort to perform daily activities. This is due to changes in the degenerative processes of the brain and central nervous system, and in cognitive functions, with increasing age. These changes affect older adults in terms of their bodies, minds, society, and lifestyles. Consequently, older people with cognitive impairment often require more complex care, causing caregivers to assume greater responsibility for the caregiving role, which can lead to higher costs for treatment and care.²¹

Cognitive frailty is a novel concept in neuropsychological and behavioral research, reflecting the complex link between the nervous system and brain function. In 2013, the International Academy on Nutrition and Aging (IANA) and the International Association of Gerontology and Geriatrics (IAGG) defined cognitive frailty as a condition characterized by the co-occurrence of physical frailty and mild cognitive impairment, but without dementia.⁵ Cognitive frailty affects the overall health, functional abilities, and overall well-being of older people.

Based on the review, recent studies have highlighted that cognitive frailty in the mild cognitive impairment (MCI) population has a greater impact on both physical and cognitive functioning. This decline can limit activities of daily living or

increase dependency.²² Evidence indicates that assessing functional abilities, particularly activities of daily living (ADLs) and instrumental activities of daily living (IADLs), may offer advantages in providing targeted care interventions to enhance self-care abilities, thereby promoting quality of life and healthy aging. This perspective aligns with recent studies demonstrating a significant association between cognitive frailty and diminished functional ability and impaired activities of daily living in older adults. Research indicates that there is a 2.63-fold decrease in IADL performance (OR = 2.63; 95%CI 1.74–3.97),²² and there is a 2-fold increased risk of functional impairment in ADL (OR = 2; 95%CI 1.6–2.6).²³ Similarly, in China, older adults with cognitive frailty exhibit a 1.4-fold increased risk of impairment in basic ADL impairment (OR = 1.41; 95%CI 1.15 – 1.74), and a 2.4-fold increased risk of IADL impairment (OR = 2.43; 95%CI 1.64–3.62),¹⁴ culminating in an elevated risk of disability.

Given the substantial evidence supporting the relationship between cognitive frailty and functional abilities, specifically basic activities of daily living (ADL) and instrumental activities of daily living (IADL), this study extends to the existing literature by examining these associations within the older population. (Figure 1)



Figure 1 Conceptual framework

Methodology

Design This study employed a cross-sectional correlational study.

Population and Sample

Population Older adults who were diagnosed and received medical treatment for MCI at Ramathibodi Hospital, Mahidol University.

Sample Older adults aged 65 years and older, both male and female, who were diagnosed with mild cognitive impairment by physicians, but without dementia and Alzheimer's disease, who visited the Outpatient Geriatric Clinic, Department of Internal Medicine, at Somdech Phra Debaratana Building, Ramathibodi Hospital, Mahidol University, Bangkok. From August 2023 to August 2024. Using a purposive sampling with inclusion criteria: 1) diagnosed with mild cognitive impairment by medical or gerontological physicians, but not presenting any clinical manifestations of dementia or Alzheimer's disease. 2) No presentation of signs of hearing loss and vision impairment, and demonstrated abilities to understand and communicate in the Thai language, with simple vocabulary. Exclusion criteria were psychiatric conditions, and participants declined to continue or voluntarily withdrew from this study.

The sample size was calculated using a power analysis conducted in G*Power. A power of the test of 0.80 and a confidence level of 95% were established, while the effect size was calculated using the odds ratios (OR). Based on a prior study, older adults with cognitive impairment were 2.4 times more likely to develop a declination of functional ability ($OR = 2.43; 1.69 - 3.49$).¹⁹ Utilizing software for sample calculation, the effect size was calculated by converting the OR value to a correlation coefficient (r), which exhibited the value of $r = 0.23$.²⁴ Then, the practical sample size based on G*Power analysis was 145 participants.

Instruments

The instruments used for data collection were as follows:

1. Demographic information consisted of 8 questions: gender, age, body mass index (BMI), marital status, education level, number of co-morbidities, smoking, and alcohol drinking. They are closed-ended and multiple-choice questions.

2. The Reported Edmonton Frail Scale Thai version (REFS-Thai) was used to evaluate frailty status. The REFS-Thai was developed from the Reported Edmonton Frail Scale (REFS) by Hilmer and colleagues (2009) and translated into Thai by Roopsawang and colleagues (2020).²⁵ The Thai version of the Edmonton Frail Scale (REFS-Thai) evaluates 9 domains, i.e., general health status, cognitive function, functional independence, continence, medication use, nutrition, mood, social support, and self-performance. The total scores of the REFS-Thai range from 0 to 18 points, which are classified into 3 categories: score 0-5 non-frailty or robust, score 6-7 Pre-frailty, and score >7 Frailty. The Thai version of REFS was tested for its validity and reliability. The item-level content validity index (I-CVI) was .97, and the scale-level content validity index (S-CVI) was .92. Additionally, the Cronbach's alpha coefficient was .73. Before using the REFS-Thai for data collection in this study, the researcher evaluated its reliability on a sample group of 10 participants who shared characteristics similar to those of the study sample. This assessment yielded a Fleiss' kappa value of $K = .98$, demonstrating a high level of reliability.

3. The Barthel Activity Daily Living Index was used to evaluate the functional ability of daily living. (BAL). The BAL was initially developed in 1965 by Mahoney and Barthel and was later translated and adapted into Thai by Jitapunkul and colleagues.²⁶ The Barthel ADL includes 10

domains, i.e. feeding, grooming, chair transfer, toileting, mobility, dressing, stair climbing, bathing, bowel control, and bladder control. Each item was graded on a scale of 0–2 points, where 0 points denoted the inability to perform activities (complete dependency), 1 point indicated the need for assistance in performing activities, and 2 points suggested partial dependence in performing activities. The total score ranges from 0 to 20 and classifies individual functioning into 3 groups: 0–4 points indicate dependence, 5–11 points represent a moderate level of reliance on activities of daily living, and 12–20 points indicate a high level of independence in activities of daily living. Before using it in this current study, the researcher evaluated the reliability of the BAL on a sample group of 10 participants whose characteristics were similar to those of the study sample. The reported reliability, as measured by Cronbach's coefficient, was 0.96.

4. The Lawton Instrumental Activities of Daily Living Scale was used to evaluate the complex activities required for functional ability of daily living. (L-IADL). Originally developed by Lawton and Brody in 1969 and later translated into Thai by Panasatit,²⁷ the L-IADL consists of 8 domains, including: ability to make telephone calls, grocery shopping, meal preparation, housekeeping, laundry, transportation use, medication management, and financial management. Each domain was assigned a score of either 0 or 1, depending on one's ability to perform IADL. Consequently, the total possible scores on the L-IADL range from 0 to 8 points. A total score of 8 indicates high functional independence, whereas a score of 0 indicates low function.¹⁸

The original L-IADL instrument was tested by comparing it with a standard instrument, demonstrating a high reliability with an inter-rater

reliability of 0.85. Before using it in this current study, the researcher evaluated the reliability of the L-IADL using a sample group of 10 participants whose characteristics were similar to those of the study sample. The reported reliability for this evaluation was a Cronbach's coefficient of 0.97, indicating excellent internal consistency.

Ethical consideration

This study was approved by the Institutional Review Board (IRB) and the Human Research Committee from the Faculty of Medicine, Ramathibodi Hospital, Mahidol University (MURA 2023/459). Before data collection began, the researcher explained the study's objectives, timeline, methods, potential risks, and benefits. Participants have the right to accept or decline participation in this study without affecting their current or future medical treatment. To indicate their agreement to participate, individuals were asked to either sign a consent form or provide verbal consent. If a participant is unable to provide a handwritten signature, a fingerprint may be used as an alternative. The data collected during this study will be used solely for research purposes and kept strictly confidential; no identifiable information will be disclosed or published. Only the researcher and the academic advisor will have access to the data, which will be securely protected. The study results are presented for academic purposes only, highlighting the study's comprehensiveness.

Data collection

1. After the study was approved by the Institutional Review Board (IRB), the researcher contacted all authorities involved in data collection at the tertiary hospital, Ramathibodi Hospital. These authorities included the Director of the Internal Medicine Outpatient Clinic and the Head Nurse, to explain the research aims and data collection procedures, as well as to obtain authorization to collect data within the specified study area.

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2. Participants were selected using a purposive sampling method following specific inclusion criteria. The researchers introduced themselves and provided a clear explanation to the participants, their relatives, and caregivers about the research's objectives, recruitment procedures, and data collection methods. They were also provided with the participants' rights to agree or disagree to participate in the research and to protect research participants. After this explanation, the researchers requested their consent to take part in the study. Those who consented were required to sign the consent form, or their relatives or caregivers with authority could sign on their behalf.

3. Since all the participants were diagnosed with mild cognitive impairment, the researcher then re-evaluated older adults' ability to remember and think by asking for their name, surname, address, and current place. In cases where older adults presented with memory and thinking problems, their relatives/caregivers were interviewed simultaneously to ensure the accuracy of the collected data.

4. The data collection process involved face-to-face interviews, each lasting approximately 20–30 minutes per participant. During data collection, the researcher consistently wore a face mask to comply with the hospital's preventive policies aimed at preventing COVID-19 transmission.

Data analysis

1. Descriptive statistics, including frequency, percentages, means, and standard deviations, were

utilized to analyze the demographic and health information, including age, gender, BMI, marital status, education level, number of co-morbidities, smoking, and alcohol drinking.

2. A correlation analysis was conducted to examine the relationship between cognitive frailty and self-perceived functional ability in older adults with mild cognitive impairment. Before the final analysis, normality testing was conducted. After verifying non-normality, Spearman's rank correlation coefficient was used for statistical analysis, with a significance level of $p < 0.05$. The magnitudes of correlation were interpreted following Cohen's (1988) criteria—small ($r_s = 0.10-0.29$), moderate ($r_s = 0.30-0.49$), and large ($r_s = 0.50-1.00$).

Results

A total of 145 older adults with mild cognitive impairment participated in this study. Regarding personal characteristics, participants' ages ranged from 65 to 96 years, with an average age of 75.96 years ($SD = 7.31$). The majority of participants were females ($n = 102$, 70.3%) and married (69.7%). Regarding educational attainment, most participants had completed their education, with 31.7% having done Bachelor's degree. Regarding medical payments, nearly 90% of participants had healthcare coverage, with 64.1% enrolled in the Civil Servant Medical Benefit Scheme. More details are presented in Table 1.

Table 1 Description of participants ($n = 145$)

Personal Characteristics	n	%
Gender		
Male	43	29.7
Female	102	70.3
Age (years) (Min-Max = 65–96; Mean = 75.96, SD = 7.31)		
65 – 69	30	20.7
70 – 79	72	49.5
≥80	43	29.8

Table 1 Description of participants (n = 145) (Cont.)

Personal Characteristics	n	%
Marital status		
Single	12	8.3
Married	101	69.7
Widowed/Divorced/Separated	32	22.1
Education levels		
Not attend formal education	1	0.7
Primary school	40	27.6
Lower Secondary Education	14	9.7
High School/ Vocational Education	16	11
Diploma	9	6.2
Bachelor's Degree	46	31.7
Master's Degree and higher	19	13.1
Health coverage/ Medical expense		
Self-payment	13	9
Civil Servant Medical Benefit Scheme	93	64.1
Universal Coverage Scheme	39	26.9

In terms of health information, most participants were within the normal weight range (BMI 18.5–22.9 kg/m²) (40%). Additionally, the majority were non-smokers (97.9%) and non-alcohol drinkers (95.2%). The participants also had various

comorbidities, such as hyperlipidemia (90.3%), hypertension (77.2%), osteoporosis (49%), and diabetes (42.1%). In addition, most participants were taking more than 5 types of medications daily (71.7%). More details are presented in Table 2.

Table 2 Description of health information in participants (n = 145)

Physical health status	n	%
Body mass index (kg/m²) (range = 16.18 - 44.50; Mean = 23.75; SD = 4.34)		
18.5 – 22.9 (Normal)	58	40.0
25.00 – 29.99 (class I obesity)	34	23.4
23.00 – 24.99 (overweight)	32	22.1
≥ 30 (class II obesity)	11	7.6
< 18.5 (Underweight)	10	6.9
History of Alcohol Consumption		
No	138	95.2
Yes	7	4.8
History of Smoking		
No	142	97.9
Yes	3	2.1
Comorbidity		
No	0	0.0
Yes*	145	100
Dyslipidemia	131	90.3
Hypertension	112	77.2

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Table 2 Description of health information in participants (n = 145) (Cont.)

Physical health status	n	%
Osteoporosis	71	49.0
Diabetes Mellitus	61	42.1
Cardiovascular disease	39	26.9
Osteoarthritis of the knees	38	26.2
Chronic kidney disease	25	17.2
Obstructive Sleep Apnea (OSA)	19	13.1
Thyroid disease	19	13.1
Having a history of stroke	15	10.3
Gouty	11	7.6
Number of Medications (Types)		
> 5	104	71.7
4 - 5	26	17.9
1-3	15	10.3

* Each participant could have more than 1 answer.

The prevalence of cognitive frailty among the participants was 62.1% (Table 3). When evaluating self-perceived functional ability in older adults through basic activities of daily living (ADL), most participants reported being able to perform these activities independently, with 97.2% indicating they could do so. The mean ADL score was 18.66

(ADL score range = 0-20; SD = 2.77). In contrast, for instrumental activities of daily living (IADL), a significant proportion of participants (65.5%) reported needing assistance with IADL tasks, with a mean L-IADL score of 4.64 (Min-Max = 0-8; SD = 2.65). Further details are available in Table 4.

Table 3 Prevalence of cognitive frailty (n = 145)

Cognitive frailty	n	%
Having cognitive frailty	90	62.1
No cognitive frailty	55	37.9

Table 4 Description of the self-perceived functional ability in basic activities of daily living (ADL) and instrumental activities of daily living (IADL) (n = 145)

Function ability	n	%
Basic activities of daily living (ADL) (ADL score, Min-Max = 0-20; Mean = 18.66; SD = 2.77)		
Dependence (0 - 4)	2	1.4
Partially independent (5 - 11)	2	1.4
Independence (12 - 20)	141	97.2
Instrumental activities of daily living (IADL) (L-IADL score, Min-Max = 0-8; Mean = 4.64; SD = 2.65)		
Independence (8)	50	34.5
Dependence (0-7)	95	65.5

Following the justification of statistical assumptions, non-parametric statistics—specifically the Spearman correlation method were employed for the final analysis. The findings of this study revealed a complex relationship among the examined variables, highlighting both the magnitude and direction of the associations. The Spearman correlation coefficient indicated a moderately

significant negative relationship between cognitive frailty and the ability to perform basic activities of daily living (ADL) ($r_s = -.418, p < .01$). Furthermore, a moderately significant negative correlation was also found between cognitive frailty and the performance of instrumental activities of daily living (IADL) ($r_s = -.494, p < .01$). Additional details about these findings can be found in Table 5.

Table 5 Correlation coefficient between cognitive frailty and self-perceived functional ability in basic activities of daily living (ADL) and the instrumental activities of daily living (IADL) (n = 145)

Variables	1	2	3
1. Cognitive frailty	1		
2. ADL	-.418*	1	
3. IADL	-.494*	.592*	1

* $p < .01$, 2-tailed

Discussion

In this study, the prevalence of cognitive frailty among older adults with MCI was 62.1%. Our findings differed from those reported in previous studies, with community-dwelling rates ranging from 1.0–12.2% and clinical-setting rates from 10.7–39.7%.^{7,28–29} For instance, in China Kong and colleagues (2024)³⁰ investigated cognitive frailty among older Chinese adults living in the community; findings revealed that the prevalence of cognitive frailty was 8.9 %. A recent study reported that the prevalence of cognitive frailty among community-dwelling older adults in Spain was 24 %, ³¹ and that the prevalence of cognitive frailty in a clinic setting in Thailand was 6.7%.⁹ Previous studies' findings suggest that frailty and mild cognitive impairment share common pathophysiological mechanisms, including inflammation, nutrition, blood vessels, metabolic factors, oxidative stress, cellular senescence, pituitary and hypothalamic function, energy metabolic imbalance, mitochondrial dysfunction, and neuroendocrine disorders.³²

Therefore, this interconnected association contributes to the development of cognitive frailty, a geriatric condition that greatly impacts an individual's physical functions, leading to dependency or risk of disability among older adults. The activities of daily living (ADL) and instrumental activities of daily living (IADL) are global indices used to assess functional dependency or disability. Thus, in older adults, age-related physical decline leads to decreased muscle mass, increased fat mass, and a weakened musculoskeletal system and joints,²³ resulting in slower movement and decreased cognition,²⁷ which may primarily affect the ability to perform daily activities.

In terms of the self-perceived functional ability among older adults, assessed by the basic ADL, it was found that the majority of the sample (97.2 %), could perform ADL themselves independently, which is consistent with the Previous study of Seesen and colleagues (2021),¹⁰ who found that older people with cognitive frailty could help themselves via ADL independently, which the ADL. However, the 8-year longitudinal study

by Aliberti and colleagues (2019) found that 23% of older people with cognitive frailty required assistance with basic ADLs at 6.7-year follow-up. Furthermore, at the end of 8 years of follow-up, over 40% of these participants required more assistance with their basic ADLs.²³ Remarkably, our findings of a non-significant association between cognitive frailty and dependency in basic ADLs should be interpreted with caution. Further studies are required to validate these results and elucidate the underlying mechanisms. In terms of IADL, the results of this present study revealed that most of the participants (65.5%) had dependency or required assistance in at least one activity of IADL. Our finding is consistent with the results of the study of older adults in China, which revealed that those with cognitive frailty had a 2.09 times higher risk of dependency in doing basic daily activities (OR= 2.09; 95% CI 0.93 – 4.71), and 3.40 times higher risk of dependency in IADL (OR=3.40; 95% CI 1.23 – 9.40),¹⁴ while other studies reported that cognitive frailty in the older adults was found to have a 23-fold impact on the IADL.³⁰ A recent study conducted by Wang and colleagues (2022) examined 735 community-dwelling older adults in China and reported that older adults with cognitive frailty had a higher risk of dependency when assessed using the basic ADL and IADL (OR = 4.38; 2.28–8.42).¹⁸

The discrepancy between our findings and those of previous studies highlights the need for more studies to clarify this substantial heterogeneity in the prevalence of cognitive frailty among older people with MCI. The inconsistencies between this study's findings and prior research may be attributed to differences in sample characteristics and geographic areas, evaluation instruments, and data collection environments. As mentioned, the higher prevalence may be due to the clinical

context; it is important to note that this study's participants were older adults with MCI receiving outpatient treatment at a geriatric clinic within a tertiary hospital setting.

Limitation Purposive sampling was employed in this study. Moreover, participants were recruited exclusively from a single tertiary hospital in Bangkok, which restricts the generalizability of the findings.

Recommendation

1. This research demonstrated a significant association between cognitive fragility and subpar IADL performance, indicating that older individuals with mild cognitive impairment (MCI) necessitate assistance with both basic and instrumental activities of daily living (ADL and IADL). These findings emphasize the importance of screening for undiagnosed geriatric diseases and cognitive frailty among nursing staff and provide guidance for implementing early management procedures.

2. Expanding the results of the study on the prevalence of cognitive frailty by conducting a study on the prevalence of cognitive frailty in other groups of older adults is recommended.

3. Further study should be conducted to identify predictive factors related to the occurrence of cognitive frailty. Further research should be conducted to improve the efficiency of the public health service system, including screening, evaluation, care, prevention, and the promotion of older adults' health, to ensure a high quality of life.

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Declaration Statement

Conflict of interest: No conflict of interest

Author Contribution: **Sawitri Usaha:** Conceptualization, Methodology, Data analysis, Data curation and Writing draft the manuscript; **Inthira Roopsawang:** Manuscript review & editing, Methodology, Data analysis, Approval of final manuscript; **Suparb Aree-Ue:** Manuscript review & editing, Methodology, Data analysis, Approval of final manuscript

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