DOI: 10.55522/jhpo.V2I6.0064 Year 2025 - Volume 2 - Issue 6 ISSN NO: 3049 - 2637

Journal of Health Physiotherapy and Orthopaedics

Research Article

Relationship between functional performance and frailty among community-dwelling elderly individuals: a cross-sectional study

Nandini A Soni*, Shyam D Ganvir

Department of Community Physiotherapy, Dr. Vitthalrao Vikhe Patil college of Physiotherapy, Ahilyanagar, Maharashtra, India

Corresponding author: Nandini Soni ✉ nandinisoni02official@gmail.com, **Orcid Id**: https://orcid.org/0009-0009-0795-4628

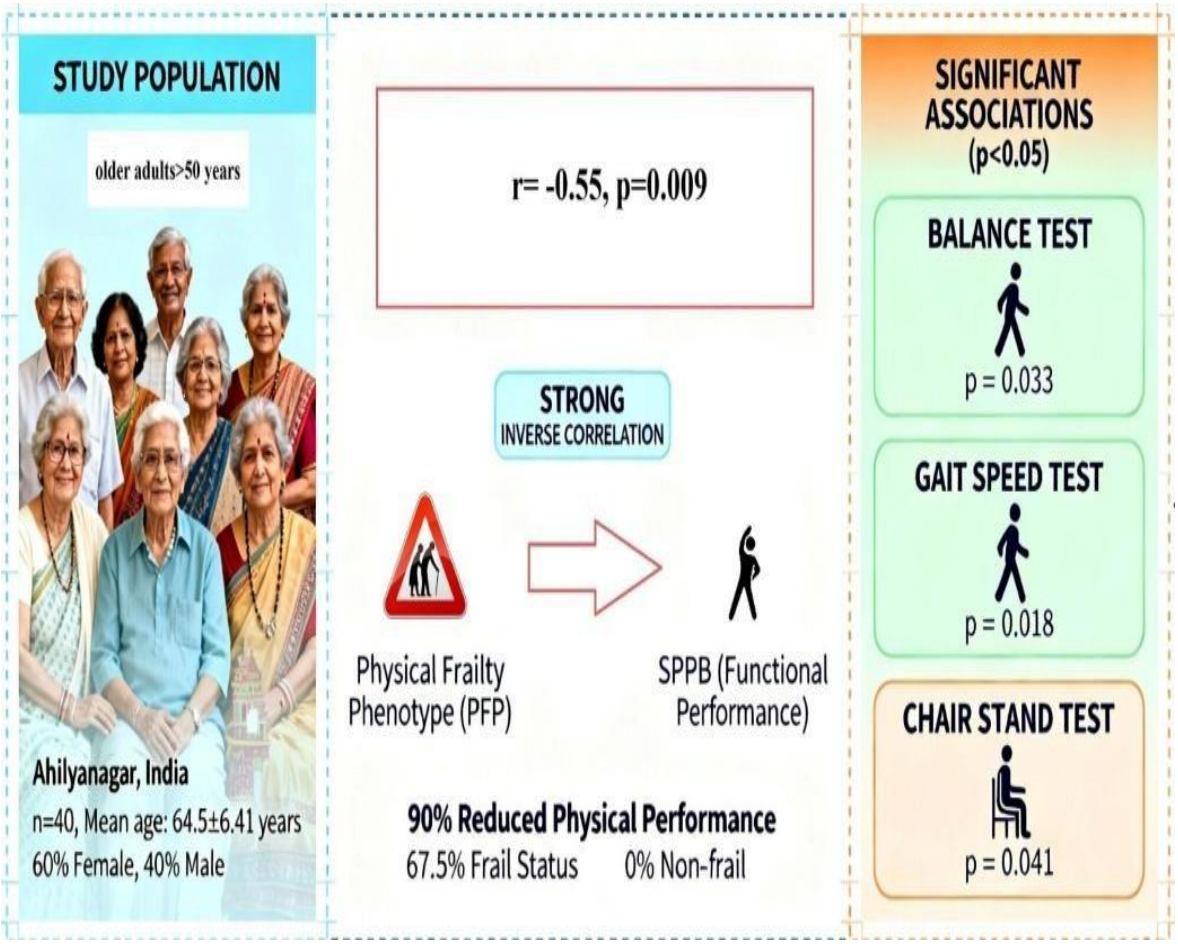
Received - 30-11-2025, **Revised** - 15-12-2025, **Accepted** - 25-12-2025 **(DD-MM-YYYY)**

Refer this article

Nandini A Soni, Shyam D Ganvir, Relationship between functional performance and frailty among community-dwelling elderly individuals: a cross-sectional study, November-December 2025, V 2 - I 6, Pages - 27 – 33. Doi: https://doi.org/10.55522/jhpo.V2I6.0064.

ABSTRACT

Given India's aging population, it is essential to comprehend age-related health issues like frailty and functional decline. Reduced physiological reserve is one of the key features of frailty, a clinical condition associated with negative outcomes like disability and falls. Physical ability tests are frequently used to evaluate functional performance, which is a reliable measure of an older adult's independence and overall health. This cross-sectional study included older people over 50 from Ahilyanagar, India.



Frailty was measured using the Physical Frailty Phenotype (PFP), and physical performance was measured using the Short Physical Performance Battery (SPPB). Pearson correlation was used to assess the relationships between frailty, functional performance, and BMI. Of the forty individuals (mean age: 64.5±6.41 years), 67.5% were deemed weak and 90% showed reduced physical performance. There was a strong negative correlation between frailty and physical performance ($r = -0.55$, $p = 0.009$), and higher frailty ratings were associated with worse functional performance. Functional performance and frailty did not appear to be related to BMI. All three SPPB domains—chair stand, gait speed, and balance—showed a significant correlation with frailty ($p < 0.05$). The study discovered a strong inverse relationship between frailty and functional performance in community-dwelling older adults. Our findings emphasize the importance of early detection and targeted exercise therapy to enhance physical performance and reduce frailty. To further our understanding, larger, more varied sample sizes and additional variables like depression and cognitive function are needed in future research.

Keywords: Frailty, Functional Performance, Elderly, SPPB, Physical Activity.

INTRODUCTION

"Projections by the Technical Group on Population Projections (July 2020) estimate that the geriatric population in India will surge to 193.4 million by 2031. This represents a substantial increase from the 2011 Census, where older adults comprised only 8.6% (103.8 million) of the total population". Such a demographic transition necessitates urgent attention to the economic, social, and healthcare requirements of the elderly. [1].

Aging society is now starting to pay more notice to the health problems of the elderly. With age, a person's muscle strength, flexibility, bone mass, glucose intolerance, and exercise capacity may all diminish [2].

Frailty is conceptualized as a state of increased vulnerability resulting from a cumulative decline in multiple physiological systems, which compromises the body's ability to withstand acute or daily stressors. An elevated risk of adverse health outcomes, such as falls, incident disability, hospitalization, and mortality, is associated with frailty, a prevalent clinical syndrome in older persons [3]. Fried et al. have operationally defined frailty in the absence of a gold standard as satisfying three of five phenotypic criteria indicating compromised energetics: low energy, reduced waking speed, limited physical activity, poor grip strength, and/or inadvertent weight loss [4]. Adults in India had a combined frailty prevalence of 36% and a pre-frailty prevalence of 48%; women were more likely to be frail (45%) than men (35%), and assessment methods varied [5].

The adaptation of physical functions, such as increased muscle strength, balance, and mobility, is gaining attention since these factors are crucial in preventing falls in older persons [6,7]. A thorough tool for evaluating the physical abilities of older persons is the functional fitness test [8]. One commonly used indicator of an adult's independence, health, and quality of life in later life is functional fitness [9].

One of the most important interventions for enhancing older persons' physical function is exercise. Physical fitness is a powerful independent predictor of death [10]. After engaging in multicomponent exercise regimens, Tarazona-Santa Balbina et al. and Sadjapong et al. demonstrated that frailty was either reversed or greatly reduced [13,14]. Exercises that included endurance, strength, balance, and flexibility were crucial for preserving cardiovascular health, muscle mass, and coordination in fragile older persons [15]. Bog Ja et al. demonstrated a strong correlation between physical performance parameters and reduced frailty, indicating that enhancing physical performance is crucial for avoiding or lessening frailty in older women [16]. However, data remains limited regarding the relationship between frailty and functional performance across both genders in community settings. Consequently, this pilot study seeks to evaluate this relationship among community-dwelling elderly men and women.

MATERIALS AND METHODS

Study design and Participants

The purpose of this cross-sectional study was to examine the frailty state and functional performance of older adults over 50 who live in the Ahilyanagar district of India. The study was approved by the Institutional ethics committee of COPT with approval number IEC/2025-735/A. The study excluded participants with musculoskeletal or neurological disorders that would have interfered with their safe participation, as well as those who were unable to walk on their own or who used support aids. The study protocol, its advantages, and the anticipated time for the evaluation were all explained to the participants. The consent form was filled

out by those who consented to take part in the study. This study is part of cross-sectional study investigating the relationship between physical performance and falls with physical activity level among elderly population.

Procedures

Frailty status

Frailty was evaluated using the Physical Frailty Phenotype (PFP) scale, which assesses five specific domains: exhaustion, unintentional weight loss, slowness, weakness, and low physical activity. Each domain is scored as 0 or 1, yielding a cumulative score out of 5. Participants were stratified as follows: non-frail (score 0), pre-frail/intermediate (score 1–2), and frail (score ≥3).

Physical performance

Functional capacity was measured using the Short Physical Performance Battery (SPPB). This tool comprises three sub-tests: (1) Balance test: Ability to hold three stances (side-by-side, semi-tandem, and full tandem) for up to 10 seconds each; (2) Gait speed: Measured over a 4-meter course at a usual pace; and (3) Chair stand test: The time required to complete five sit-to-stand repetitions.

Statistical analysis

Statistical analysis was performed using SPSS. The characteristics of the sample were determined through descriptive tests (mean and standard deviation). Pearson correlation tests were used to estimate the relationship between frailty and physical performance. Along with this, correlation tests were used to analyse association of frailty and physical performance with BMI, and frailty with the 3 divisions of physical performance.

RESULT

Table 1: Descriptive statistics of study participants

Variables	Mean ± SD/ n (%)
AGE	64.5±6.41
SEX	
Male	40.0%
Female	60.0%
BMI	26.49±3.86
Comorbidities	
Hypertension	45.0%
Diabetes mellitus	17.5%
NA	37.5%
Literacy level	
Literate	17.5%
Illiterate	82.5%
Physical Frailty phenotype	2.55±0.78
Short physical performance battery test	7.16±1.72

*Data presented as mean ± standard deviation for continuous variables and frequency (percentage) for categorical variables; BMI = Body Mass Index; NA = Not Applicable

Table I summarises this study's descriptive data (mean ± standard deviation). The mean age of the samples were 64.5 years.

Table 2: Frequency distribution

FRAILTY STATUS	N (%)
Non frail	0
Pre/intermediate frail	13 (32.5%)
Frail	27 (67.5%)
PHYSICAL PERFORMANCE	
Worst physical performance	2(5.0%)
Reduced physical performance	36(90.0%)
Best physical performance	2(5.0%)

Frequency distribution of subjects in frailty and SPPB domains are given in table II.

Table 3: Correlation between physical frailty phenotype (PFP), short physical performance battery protocol (SPPB) and BMI

VARIABLES	r	p
PFP and SPPB	**-0.55**	**0.009**
PFP and BMI	-0.03	0.546
SPPB and BMI	-0.02	0.468

*PFP = Physical Frailty Phenotype; SPPB = Short Physical Performance Battery; BMI = Body Mass Index †r = Pearson correlation coefficient

In order to test the relationship between physical frailty phenotype, short physical performance battery and BMI, Pearson correlation was carried out (Table III). A Pearson correlation was performed to determine if there is a negative correlation between variables FPI and SPPB. There is a high, negative correlation between variables FPI and SPPB with r= -0.55. The result of the Pearson correlation showed that there was a significant negative correlation between FPI and SPPB, r= -0.55, p = .009. For BMI and SPPB, there is no significant, negative correlation between variables BMI and SPPB with r= -0.02. For BMI and FPI, there is no significant, negative correlation between variables BMI and FPI with r= -0.03.

Table 4: Correlation between frailty and physical performance

VARIABLE	BALANCE TESTS	GAIT SPEED TEST	CHAIR STAND TEST
FRAILTY (p-value)	0.033	0.018	0.041

*Statistically significant correlation ($p < 0.05$)

Table IV shows the correlation between frailty with the 3 domains of SPPB individually. Balance tests, chair stand test and gait speed tests were found to be significantly associated with frailty with p<0.005.

The frequency distribution of physical frailty phenotype shows Exhaustion (60.0 %), weakness (90 %) and slowness (100.0 %) were found to be more frequently present in older adults.

Figure 1: This figure visualizes the inverse relationship between functional performance (SPPB) and frailty (FPI), revealing that individuals with higher SPPB scores generally exhibit lower frailty scores. The negative correlation demonstrates that better physical function is associated with reduced frailty, with a moderate and statistically significant association in this sample.

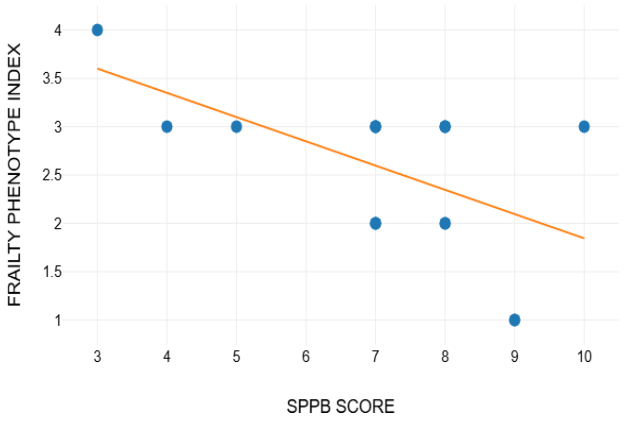


Figure 2: This graph shows body mass index and physical performance relationship. The negligible and non-significant correlation suggests that BMI does not meaningfully predict or relate to functional performance among this group of elderly participants. The data indicate that other factors, rather than BMI, may be more important drivers of physical function in aging adults.

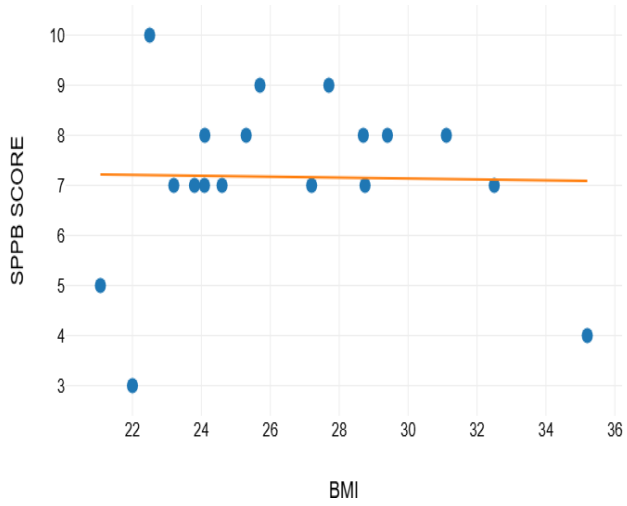
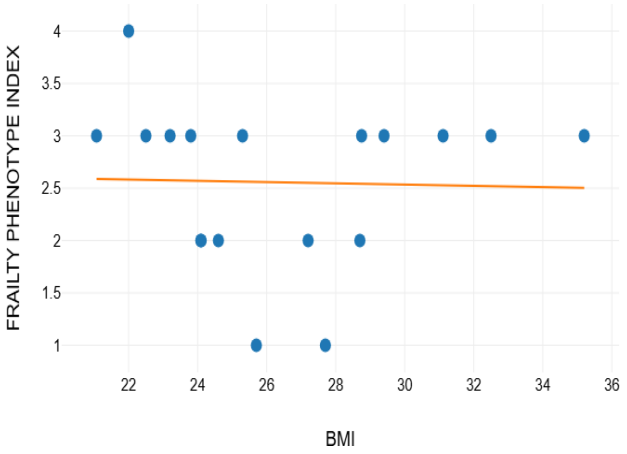


Figure 3: This figure presents the association between frailty status and BMI in older adults. The very weak and statistically non-significant correlation signals that frailty, as measured by PFP, is largely unrelated to BMI in this study cohort. These findings highlight the predominance of non-anthropometric contributors to frailty among the population studied



DISCUSSION

Over the past century, human life expectancy has steadily increased in the majority of nations [17]. However, an increasing amount of research acknowledges that the variability in structural, functional, and physiological alterations linked to human aging cannot be explained only by chronological age. It has been suggested that people who age more quickly are weak, and that frailty itself may be identified, which can aid in the planning of the right kind of assistance and care [18,19].

The overlap in the factors for frailty identification indicates that, despite the differences in idea, there is some common ground [20]. One of these prevalent connections is physical fitness or motor performance, which is linked to a person's functional decline and important indicators for assessing the likelihood of unfavourable consequences [21,22].

Using the Physical Frailty Phenotype (PFP) and Short Physical Performance Battery (SPPB), this pilot study investigated the relationship between frailty and functional performance in older adults living in the community. Frailty and physical performance were shown to be statistically significantly correlated negatively ($r = -0.55$, $p = 0.009$), indicating that functional ability decreases with increasing frailty severity.

Physiological aging causes a number of changes in the human brain, including as small vessel disease, brain shrinkage, and the accumulation of misfolded proteins like tau, amyloid-β peptide, and α-synuclein [23]. These alterations, which show up as cellular and molecular abnormalities, have been seen in the brains of elderly people who are cognitively normal and generally healthy. Therefore, the drop in motor function in older individuals may be attributed to age-related decreases in dopamine levels, since aging is linked to a steady deterioration in the cerebral dopaminergic system in humans [24,25].

According to a meta-analysis by Gupta et al. (2025), which estimated a pooled frailty prevalence of 36% among Indian older individuals, the national average for frailty prevalence was lower than the prevalence in our sample (67.5 %) [26]. The short sample size and localized demographic features could be the cause of this disparity. Frailty and SPPB scores had a negative correlation, which is in line with research from other countries. For example, Fried et al.'s Cardiovascular Health Study (2001) revealed that

frailty had a strong relationship with low physical activitylow grip strength, and slow walking speed [4].

In our study, each of the three SPPB components—balance, gait speed, and chair stand—was found to be strongly linked with frailty ($p<0.05$). Caroline de Fátima Ribeiro Silva et al. (2021) support their results by saying that SPPB is a good predictor of death and disability in the elderly. Unlike some other studies like Jeoung et al. (2015), which linked BMI with frailty, our results showed no noteworthy link between BMI and either physical performance or frailty ($p<0.05$) [28].

Regular physical activity, including aerobic, strength, and flexibility exercises, is advised by the American College of Sports Medicine (ACSM) and WHO to help slow down aging and frailty [29]. The strong link between SPPB domains and frailty in our research also emphasizes the need to stay physically active to postpone the start of frailty.

In our study, we found significant reduction in Exhaustion, slowness and weakness. This can be explained by deficits in the transport of fatty acids across mitochondrial membranes and glucose across cellular membranes which seem to be linked to frail phenotypes in previous studies. The burden of ATP synthesis seems to shift toward substrate level phosphorylation, particularly the highly fatigable ATP-PCr pathway, when the efficiency of fueling mitochondrial oxidative phosphorylation is reduced [30]. Crucially, it has been demonstrated that metabolites linked to ATP-PCr system activation decrease contractile force, or fatigue, in isolated skeletal muscle fibers. Frail older persons may experience persistent fatigue, muscle weakness, slow walking, and difficulties completing basic daily tasks as a direct result of this. The development of physical frailty should be attributed in part to metabolic inflexibility, particularly within skeletal muscle tissue [31].

It has been repeatedly demonstrated that multicomponent exercise therapies, such as training for strength, endurance, balance, and flexibility, can lessen or reverse frailty, improve clinical outcomes, and improve older persons' overall quality of life. A comprehensive analysis by de Labra et al. found that structured exercise programs significantly improve frail status, improve physical performance, including gait speed and balance, and have a positive impact on inflammatory markers like IL-6 and CRP. These results demonstrate how exercise improves systemic physiological resilience in vulnerable older people [32].

Exercise therapies significantly enhanced physical function, ADLs, and quality of life in frail elderly individuals, according to a meta-analysis by Chou et al. (2012) [33]. These developments are particularly important in preventing the increase of dependency and impairment. A multicomponent exercise program improved SPPB results, decreased frailty scores, and decreased inflammatory biomarkers among local senior citizens, according to a randomized controlled trial by Sadjapong et al. (2020) [34]. These studies collectively support our findings that frailty and SPPB performance were negatively correlated, suggesting that frailty increases with decreased physical activity.

The demanding farming methods used by older people, such as ploughing, harvesting, and hauling heavy weights, lead to slowness and frailty in their later years. These practices also promote sarcopenia, muscle fatigue, and joint damage [35]. Living in a rural area limits access to preventive care and rehabilitation, which worsens untreated muscle and joint issues, as well as chronic conditions like hypertension, affecting 45.0% of participants [36]. Food insecurity and financial struggles, which are common in rural farming regions, further weaken energy and nutrient levels. This situation increases fatigue and functional disability. The combination of healthcare challenges, lifelong occupational stress, and the socioeconomic traits of Ahilyanagar's farming community provides a reasonable explanation for the rise in frailty and the decline in physical performance that we observed in our study.

Preliminary research findings demonstrate a strong correlation between frailty and functional performance. This implies that frailty may be very important connecting fall risk and physical activity. It underlines the need for further study to investigate how different degrees of physical exercise influence functional results and fall risk in seniors. Hence, further research might build on the present pilot by adding a more thorough examination of physical activity patterns and their influences on fall prevention techniques and functional performance in a bigger senior population.

Limitations

Our study may have a few limitations. First, a limited sample size limits the findings' applicability to older adults in general. The distribution of males and females was not equal. Second, the study did not look at any relationship

between comorbidities with frailty or physical performance. Third, the significant degree of illiteracy among participants may have affected their comprehension and performance of the activities, which could have affected the study's findings because performance-based outcome measures were employed. Lastly, prior research has demonstrated that depression and cognitive impairment might have a substantial impact on frailty status; however, the current study did not include these psychosocial factors, which may have reduced the findings' comprehensiveness [25-27].

CONCLUSION

It has been proposed that the functional performance level of older adults is substantially correlated with their frailty condition. We found no correlation between an individual's BMI and their level of functional performance, which is in contrast to the findings of the prior study. The formulation of an exercise program based on an individual's functional performance level can also be aided by this study.

REFERENCES

1. Chou CH, Hwang CL, Wu YT, 2012. Effect of exercise on physical function, daily living activities, and quality of life in the frail older adults: a meta-analysis. Arch Phys Med Rehabil. 93(2), Pages 237-44. Doi: 10.1016/j.apmr.2011.08.042.

2. Xue QL, 2011. The frailty syndrome: definition and natural history. Clin Geriatr Med. 27(1), Pages 1-15. Doi: 10.1016/j.cger.2010.08.009.

3. Fried LP, Tangen CM, Walston J, et al, 2001. Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci. 56(3), Pages M146-M156. Doi:10.1093/gerona/56.3.m146.

4. Sunanda Gupta, Aninda Debnath, Ankit Yadav et al, 2025. Nationwide insights into frailty: Systematic review and meta-analysis of community-based prevalence studies from India. The Journal of Frailty & Aging. Doi: https://doi.org/10.1016/j.tjfa.2025.100032.

5. Singh, Devinder K A et al, 2015. Association between physiological falls risk and physical performance tests among community-dwelling older adults. Clinical interventions in aging. Doi:10.2147/CIA.S79398.

6. Zhao Y, Chung P-K, 2016. Differences in functional fitness among older adults with and without risk of falling. Asian Nurs Res. 10(1), Pages 51–5. Doi: https://doi.org/10.1016/j.anr.2015.10.007.

7. Craig CM, Sénéchal M, McLellan AG et al, 2016. Time Spent in Select Physical Activity Intensities and Sedentary time, Associations with Physical Capacity in Inactive Older Adults. Journal of Physical Activity Research. 1(1), Pages 31-35. Doi: 10.12691/jpar-1-1-7.

8. Podsiadlo D, Richardson S, 1991. The timed "Up & Go": a test of basic functional mobility for frail elderly persons. J Am Geriatr Soc. 39(2), Pages 142-8. Doi: 10.1111/j.1532-5415.1991.tb01616.x.

9. Park YI, Lee KY, Kim TI et al, 2012. The Effects of Exercise in the Frail Elderly. Res Community Public Health Nurs. 23(1), Pages 91-101. Doi:10.12799/jkachn.2012.23.1.91.

10. Bonder BR, Pickens N, and Dal Bello-Haas V, 2024. Functional and Occupational Performance in Older Adults. 5th ed. Philadelphia: F.A. Davis Company. Pages 150-200.

11. Prasad L, Fredrick J, Aruna R, 2021. The relationship between physical performance and quality of life and the level of physical activity among the elderly. J Educ Health Promot. 10, Pages 68. Doi: 10.4103/jehp.jehp_421_20.

12. Sadjapong U, Yodkeeree S, Sungkarat S, et al, Multicomponent Exercise Program Reduces Frailty and Inflammatory Biomarkers and Improves Physical Performance in Community-Dwelling Older Adults: A Randomized Controlled Trial. Int J Environ Res Public Health. 17(11), Pages 3760. Doi: 10.3390/ijerph17113760.

13. Tarazona-Santabalbina FJ, Gómez-Cabrera MC, Pérez-Ros P, et al, 2016. A Multicomponent Exercise Intervention that Reverses Frailty and Improves Cognition, Emotion, and Social Networking in the Community-Dwelling Frail Elderly: A Randomized Clinical Trial. J Am Med Dir Assoc. 17(5), Pages 426-433. Doi: 10.1016/j.jamda.2016.01.019

14. Angulo J, El Assar M, Álvarez-Bustos A et al, 2020. Physical activity and exercise: Strategies to manage frailty. Redox Biol. Doi: 10.1016/j.redox.2020.101513.

15. Jeoung BJ, Lee YC, 2015. A Study of relationship between frailty and physical performance in elderly women. J Exerc Rehabil. 11(4), Pages 215-9. Doi: 10.12965/jer.150223.

16. Michel, jean-pierre. 2015. WHO World Report on Ageing 2015. 10.13140/RG.2.1.5058.8245.

17. Kane AE, Howlett SE, 2019. Spelunking the biology of frailty. Mech Ageing Dev. Doi: 10.1016/j.mad.2019.111123.

18. Rockwood K, Howlett SE, 2019. Age-related deficit accumulation and the diseases of ageing. Mech Ageing Dev. 180, Pages 107-116. Doi: 10.1016/j.mad.2019.04.005.

19. Hoogendijk EO, Afilalo J, Ensrud KE et al, 2019. Frailty: implications for clinical practice and public health. Lancet. 394(10206), Pages 1365-1375. Doi: 10.1016/S0140-6736(19)31786-6.

20. Cooper R, Kuh D, Cooper C, et al, 2011. Objective measures of physical capability and subsequent health: a systematic review. Age Ageing. 40(1), Pages 14-23.

Doi: 10.1093/ageing/afq117.

21. Pedrero-Chamizo R, Gómez-Cabello A, Meléndez A, et al, Higher levels of physical fitness are associated with a reduced risk of suffering sarcopenic obesity and better perceived health among the elderly: the EXERNET multi-center study. J Nutr Health Ageing. 19(2), Pages 211-217. Doi:10.1007/s12603-014-0530-4.

22. Gupta S, Debnath A, Yadav A, et al, 2025. Nationwide insights into frailty: Systematic review and meta-analysis of community-based prevalence studies from India. J Frailty Aging. 14(2), Pages 100032. Doi: 10.1016/j.tjfa.2025.100032.

23. Schirinzi T, Canevelli M, Suppa A, et al, 2020. The continuum between neurodegeneration, brain plasticity, and movement: a critical appraisal. Rev Neurosci. 31(7), Pages 723-742. Doi: 10.1515/revneuro-2020-0011.

24. Berry AS, Shah VD, Baker SL, et al, Ageing Affects Dopaminergic Neural Mechanisms of Cognitive Flexibility. J Neurosci. 36(50), Pages 12559-12569. Doi:10.1523/JNEUROSCI.0626-16.2016.

25. Ishibashi K, Ishii K, Oda K et al, 2009. Regional analysis of age-related decline in dopamine transporters and dopamine D2-like receptors in human striatum. Synapse. 63(4), Pages 282-90. Doi: 10.1002/syn.20603.

26. de Fátima Ribeiro Silva, Caroline, et al, 2021. Short physical performance battery as a measure of physical performance and mortality predictor in older adults: a comprehensive literature review. International journal of environmental research and public health 18.20 (2021): 10612.

27. Jeoung BJ, Lee YC, 2015. A Study of the relationship between frailty and physical performance in elderly women. J Exerc Rehabil. 11(4), Pages 215-9. Doi: 10.12965/jer.150223.

28. Lewsey SC, Weiss K, Schär M, et al, 2020. Exercise intolerance and rapid skeletal muscle energetic decline in human age-associated frailty. JCI Insight. 5(20), Pages e141246. Doi: 10.1172/jci.insight.141246.

29. Fountain WA, Bopp TS, Bene M, et al, 2024. Metabolic dysfunction and the development of physical frailty: an ageing war of attrition. Geroscience. Doi: 10.1007/s11357-024-01101-7.

30. de Labra C, Guimaraes-Pinheiro C, Maseda A, et al, 2015. The effect of exercise program interventions on frailty, clinical outcomes, and biomarkers in older adults: A systematic review. Archives of Gerontology and Geriatrics. 60(3), Pages 522–530. Doi: https://doi.org/10.1016/j.archger.2015.01.016.

31. Chou CH, Hwang CL, Wu YT, 2012. Effect of exercise on physical function, daily living activities, and quality of life in the frail older adults: a meta-analysis. Arch Phys Med Rehabil. 93(2), Pages 237–244. Doi: 10.1016/j.apmr.2011.08.042

32. Sadjapong U, Yodkeeree S, Sungkarat S, et al, Multicomponent exercise program reduces frailty and inflammatory biomarkers and improves physical performance in community-dwelling older adults: a randomized controlled trial. Int J Environ Res Public Health. 17(11), Pages 3760. Doi: 10.3390/ijerph17113760.

33. Demos K, Sazakli E, Jelastopulu E, et al, 2013. Does farming have an effect on health status? A comparison study in west Greece. Int J Environ Res Public Health. 10(3), Pages 776-792. Doi:10.3390/ijerph10030776.

34. Rasekaba TM, Pereira P, Rani G V, et al, 2022. Exploring Telehealth Readiness in a Resource Limited Setting: Digital and Health Literacy among Older People in Rural India (DAHLIA). Geriatrics (Basel). 7(2), Pages 28. Doi:10.3390/geriatrics7020028.

35. Dey S Nambiar, D Lakshmi, 2012. Health of the elderly in india: challenges of access and affordability. In: Smith, J; Majmundar, M, (eds.) Aging in Asia: Findings from New and Emerging Data Initiatives. The National Academies Press, Washington, D.C. ISBN 978-0-415-57977-3.