

Normal gait speed, grip strength and thirty seconds chair stand test among older Indians



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ABSTRACT

Introduction: Gait speed, maximum grip strength and thirty seconds chair stand test are quick, reliable measures of functional capacity in older adults. The objective of this study was to develop normative data of the said parameters, which is lacking in older Indians.

Methodology: In a cross sectional study, 723 participants of ≥ 60 years without any morbidity, were recruited with written consent at Geriatric Medicine clinic of All India Institute of Medical sciences, New Delhi. Time taken to walk comfortably (4 m) was taken as Gait speed. Maximum grip strength was assessed by using dynamometer by pressing it for 3 times in each hand, and the best of six values noted. Thirty second chair stand was assessed by the number of repetitions to stand and sit from a chair in thirty second.

Result: The Cut-off (25th percentile) of gait speed for both male and female in all age group was 0.6 m/s. The Cut-off for maximum grip strength in 60–65 years, 66–70 years and >70 years for male were 20, 15 and 15 and for females were 8, 6 and 6 in kg, respectively. The Cut-off for thirty second chair stand test in 60–65 years, 66–70 years and >70 years for male were 10, 9 and 8 and for females was 8, 8 and 7, respectively.

Conclusion: These normative data would be useful to the clinicians and researcher as Indian reference value, which is less as compared to western data. Community based multi-centre study is needed.

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1. Introduction

India's older adults above the age group of 60 are projected to increase dramatically over the coming years, from 8.9% in 2015 to 19.4% in 2050, according to the [United Nations Population Division](#). A good physical functioning is vital for the independence and quality of life in older people and is important for adding life to years ([Drewnowski & Evans, 2001](#)).

In the dynamic human aging process, physical decline could be assessed by checking for functional capacity, defined as the individual's ability to perform survival related activities in an autonomous and independent manner. Functional capacity is core of an efficient geriatric assessment, giving information about current health status and helps in designing the management plan ([Guralnik & Ferrucci, 2003](#)). There are various measures to assess

the physical function in older adults. Gait speed ([Peel, Kuys, & Klein, 2013](#)), grip strength ([Bohannon, 2008](#)) and Thirty seconds chair stand test ([McCarthy, Horvat, Holtsberg, & Wisenbaker, 2004](#)) are objective measures of functionality that can be easily done in any settings by any health professional.

Gait is defined as the manner in which a person walks, characterized by rhythm, cadence, step length, stride length, and speed ([American Physical Therapy Association, 2001](#)). The physical functional status and quality of life of an elderly individual are directly proportional to the walking speed ([DePew, Karpman, Novotny, & Benzo, 2013](#); [Kutner, Zhang, Huang, & Painter, 2015](#)). Comfortable gait speed is a measure of lower body strength and balance. Apart from rendering an adult functionally independent, studies have shown that gait speed is strongly associated with length of stay and discharge after stroke rehabilitation ([Rabadi & Blau, 2005](#)), mortality ([Ostir, Kuo, Berges, Markides, & Ottenbacher, 2007](#)) and incident of dementia of older adults ([Waite et al., 2005](#)), etc. Comfortable Gait speed thus becomes an important indicator of functional status of elderly and it can be even considered as the

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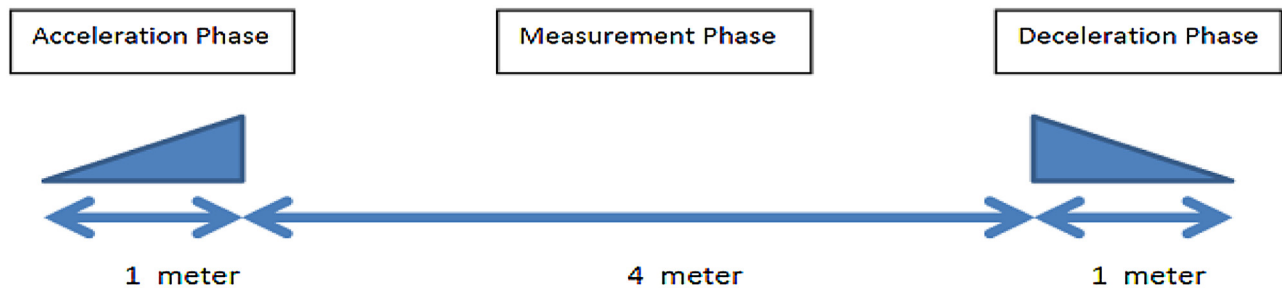


Fig. 1. Measuring Gait speed.

sixth vital sign (Fritz & Lusardi, 2009). The normal gait speed varies with height of the person, due to change in stride length. As each race has unique phenotype, a normative reference data for Indian population which is lacking at present, needs to be determined. Thus assessing gait speed will help clinicians in outpatient and primary care settings to assess the functional status; to predict outcomes like disability, dementia, falls, hospitalisation, efficacy of rehabilitation exercises and death (Peel et al., 2013; Sasaki, Kasagi, Yamada, & Fujita, 2007).

Maximum Grip strength is a measure of strength of upper limb and is also a predictor of functional status and well-being of elderly. Studies showed that grip strength is an accurate and consistent predictor of all causes of mortality in older adults (Sasaki et al., 2007). Grip strength diminishes with age, and men are consistently stronger than women (Desrosiers, Bravo, Hébert, & Dutil, 1995). Some researchers suggested that grip strength be a screening tool for women at risk of osteoporosis (Di Monaco, Di

Monaco, Manca, & Cavanna, 2000). Longitudinal studies suggest that poor grip strength is predictive of increased mortality from cardiovascular disease and from cancer in men, even when factors of muscle mass and body mass index (BMI) are adjusted for (Gale, Martyn, Cooper, & Sayer, 2007). It has also proved to be a prognostic indicator of mortality risk in a population of elderly



Fig. 2. Hand dynamometer.



Fig. 3. Measurement of Maximum Grip strength, arms by side.

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