

Fall risk and balance outcomes in healthy young adults: A call for research

Muhammad Osama, Mahnoor Waseem, Hira Imran

Madam, a great emphasis has been paid on measurement and improvement of balance in the elderly in gerontology and neuromuscular rehabilitation, and both fall risk and balance deterioration are found to be significantly correlated with advancing age in the elderly, and for a long time, balance has been thought of being a major predictor of falls.^{1,2} Contrary to the popular belief, falls are not uncommon in healthy young individuals either, with an incidence of 18%, as compared to 21% and 35% for the middle aged and older adults respectively.² This finding is also reinforced by the data of 80 million reported falls in community dwelling U.S adults, out of which 32.3% were reported to be young adults, 35.3% middle aged and 32.3% were older adults.³ Even though it is perceived that sports and recreational activities would be the most common activity resulting in falls in healthy young adults,

of 72.2%, the most common of which were sprains and strains (46.2%) (Table).² All of these findings point out towards the fact that gait, balance and mobility impairments are not only prevalent but can also be a possible risk factor for falls in healthy young individuals, other than decreased muscle strength, increased postural sway and skeletal muscle specific troponin-T.⁴ Moreover it is also shown that fall risk is more related to dynamic and static stability of the individual rather than age,⁵ as shown in Granata KP et al's study showing poorer dynamic stability in fall prone young individuals in comparison to both healthy young adults and elderly.⁶ Moreover, it has also been shown that healthy young adults are more dependent on visual stimuli as compared to vestibular stimuli and somato-sensory systems for the maintenance of balance.⁷ This finding is also reinforced by the fact that

Table: Activities, perceived causes, environmental factors and injuries associated with falls in healthy young adults.²

Activities performing prior to Fall					
Ambulation	Transferring	Running	Sports/Recreational	Stairs	Other
31.5%	9.3%	20.4%	22.2%	7.4%	9.3%
Perceived Cause of Fall					
Accident/Environment	Collapse Episode	Dizziness/Vertigo/Weakness	Balance/Gait Impairment	Other/Uncertain	
37%	5.6%	5.6%	38.9%	13%	
Environmental factors leading to Fall					
Wet surface/Slippery foot wear	Uneven surface	Objects on surface	External surface	Icy surface	Dark environment, glare and new eye glasses
9.3%	20.9%	9.4%	7%	20.9%	32.6%
Injured from Fall					
No			Yes		
27.8%			72.2%		
Cut/Laceration	Bruise/Hematoma	Sprain or Strain	Fracture	Other	
15.4%	28.2%	46.2%	7.7%	2.6%	

but according to literature it is ambulation in 31.5% of cases.² Similarly, the most common perceived cause of fall is found to be balance and gait impairment (38.9%) and the most common environmental factor resulting in fall is found to be uneven surfaces and steps (20.9%).² It is reported that it was more common for healthy young adults as compared to middle aged and older adults, to experience an injury resulting from fall with an incidence

.....
Foundation University Institute of Rehabilitation Sciences FUIRS, Islamabad, Pakistan.

Correspondence: Muhammad Osama. Email: osamadpt@gmail.com

dark environment, glare from lights and new eye glasses are the most common environmental factors leading to falls in healthy young adults (Table).² On the other hand Ghiringhelli R et al⁸ and Nicholas DS et al⁹ have provided normative values for limits of stability, sway velocity and center of base, however the literature is deficient in terms of evidence on normative values of fall risk, postural stability index (PSI), clinical test of sensory integration of balance (CTSIB) and Balance Error Scoring System (BESS) for healthy young adults. Nonetheless, Linder SM et al developed a new outcome measurement tool called Cleveland Clinic Postural Stability Index as an alternate to

BESS and reported the normative values for healthy young adults.¹⁰ Fall risk, PSI¹¹ and BESS are found to be valid and reliable measurement tools in the healthy young adult population, however, the validity and reliability of CTSIB is not established for healthy young adults,¹² signifying the lack of attention being paid to the subject of discussion. Thus in light of existing literature it is not only imperative to screen young individuals, but also establish the normative values for fall risk and balance parameters.

Disclaimer: None

Conflict of Interest: None.

Funding Disclosure: None.

References

1. Siddiqi FA, Masood T, Osama M, Azim ME, Babur MN. Common balance measures and fall risk scores among older adults in Pakistan: Normative values and correlation. *J Pak Med Assoc.* 2019; 69:246-9.
2. Talbot LA, Musiol RJ, Witham EK, Metter EJ. Falls in young, middle-aged and older community dwelling adults: perceived cause, environmental factors and injury. *BMC Public Health.* 2005; 5:86.
3. Verma SK, Willetts JL, Corns HL, Marucci-Wellman HR, Lombardi DA, Courtney TK. Falls and fall-related injuries among community-dwelling adults in the United States. *PLoS One.* 2016; 11:e0150939.
4. King GW, Abreu EL, Cheng AL, Chertoff KK, Brotto L, Kelly PJ, et al. A multimodal assessment of balance in elderly and young adults. *Oncotarget.* 2016; 7:13297-306.
5. Overstall PW, Exton-Smith AN, Imms FJ, Johnson AL. Falls in the elderly related to postural imbalance. *Br Med J.* 1977; 1:261-4.
6. Granata KP, Lockhart TE. Dynamic stability differences in fall-prone and healthy adults. *J Electromyogr Kinesiol.* 2008; 18:172-8.
7. Grace Gaerlan M, Alpert PT, Cross C, Louis M, Kowalski S. Postural balance in young adults: the role of visual, vestibular and somatosensory systems. *J Am Acad Nurse Pract.* 2012; 24:375-81.
8. Ghiringhelli R, Ganança CF. Posturography with virtual reality stimulations in normal young adults with no balance complaints. *J Soc Bras Fonoaudiol.* 2011 Sep; 23:264-70.
9. Nichols DS, Glenn TM, Hutchinson KJ. Changes in the mean center of balance during balance testing in young adults. *Phys Ther.* 1995; 75:699-706.
10. Linder SM, Ozinga SJ, Koop MM, Dey T, Figler R, Cruickshank J, et al. Cleveland Clinic Postural Stability Index Norms for the Balance Error Scoring System. *Med Sci Sports Exerc.* 2018; 50:1998.
11. Cacheupe WJ, Shifflett B, Kahanov L, Wughalter EH. Reliability of biodex balance system measures. *MPEES.* 2001; 5:97-108.
12. Murray N, Salvatore A, Powell D, Reed-Jones R. Reliability and validity evidence of multiple balance assessments in athletes with a concussion. *J Athl Train.* 2014; 49:540-9.

<https://doi.org/10.5455/JPMA.38023>