Fall risk screening and balance rehabilitation in elderly: a missing healthcare intervention in Pakistani healthcare system.

Muhammad Ehab Azim,[1,2] Ejaz Asghar,[3] Muhammad Naveed Babur,[4] Farooq Azam Rathore[5]

Abstract

Elderly are one of the fastest-growing population globally and require significant healthcare services due to age-related deterioration in physiological systems. Poor postural control due to aging results in impaired balance leading to increase in frequency of falls, poor quality of life, and rise in disability and mortality rates. In Pakistan, due to lack of awareness, and resources, fall prevention and screening programmes for the elderly are lacking. Regular fall risk screening utilizing balance assessment tools, integration of fall prevention programmes and balance rehabilitation approach as part of elderly healthcare services can serve as tools to lower the incidence of falls in the elderly population of Pakistan. Moreover, integration of latest technology as part of balance rehabilitation can also be considered. The review aims to highlight appropriate strategies for fall risk screening and balance rehabilitation in an effort to promote an important healthcare intervention for elderly in Pakistan.

Keywords: Aging, Balance Rehabilitation, Elderly, Fall Risk, Pakistan.

DOI: 10.47391/JPMA.23-23

Introduction

Elderly population is one of the fastest growing age groups worldwide. There were an estimated 10 million elderly above 65 years of age in Pakistan in 2021 and this number is expected to rise to 14% of the total population by 2050.[1] Aging results in significant deterioration of physiological systems and functional status leading to chronic disabilities, deteriorating quality of life, and increased utilization of healthcare services. Healthcare interventions specific to elderly are generally lacking in the country. Geriatrics and gerontology are still not widely available as separate healthcare specialties in Pakistan and geriatric care is fragmented and suboptimal. Additionally, there is significant lack of implementation of healthcare legislation related to elderly in Pakistan. A National policy for the promotion of better health of the elderly was designed in 1999 but is yet to be implemented.[2] Rapidly increasing aging population with significant need for healthcare along with a lack of specialized services highlights the urgent need for change in focus of health policy and practice to improve quality of life of elderly. One such area that needs attention is fall risk screen and fall prevention programmes.

Falls in Elderly

Age-related deterioration in postural stability leads to a significant increase in fall risk. Literature suggests an increased risk of falls among elderly population of Pakistan, resulting in hospitalisation, severe limb trauma in 66% of cases and death in 1.3% of cases.[3] In Pakistan, where majority of health expenses are borne out of pocket by patient, fall-related health cost can increase exponentially if fall risk screening and prevention is not focused upon.[4] In addition to the financial burden, a fall may result in devastating consequences for the individual, like increased morbidity, fear of falling, reduced quality of life, greater dependency on others, medical institutionalization, and premature mortality. To decrease the burden of morbidity and mortality, it is necessary that falls in elderly must be prevented.

Need for Fall Risk Screening

Impaired balance is the major cause of falls and is further deteriorated due to lack of physical activity and the aging process. The Centers for Disease Control and Prevention , USA recommends, that primary care physicians should screen patients annually for fall risk using specific screening tools.[5] Identification of individuals at risk of falls by appropriate screening, followed by balance rehabilitation and fall prevention interventions can be an effective strategy. However, the rate of implementation of fall prevention and screening programmes in clinical practice is quite low. One reason for this can be that screening for falls is perceived as additional work, but such screening could be easily incorporated into the usual flow of history taking and information gathering

[1]Foundation University Islamabad, [2]PhD Scholar, Isra Institute of Rehabilitation Sciences, Isra University Islamabad Campus, [3]Isra Institute of Rehabilitation Sciences, Isra University Islamabad Campus, Islamabad, [4]Faculty of Allied Health Sciences, Superior University Lahore, [5]Armed Forces Institute of Rehabilitation Medicine (AFIRM), Rawalpindi, Pakistan

Correspondence: Farooq Azam Rathore. Email: farooqrathore@gmail.com

ORCID ID:

from the patients.[6] Fall prevention is also the 6th goal in international patient safety goals of Joint Commission International Accreditation (JCIA). It comprises of interdisciplinary team responsible for evaluating the environment, equipment, fall programme elements, and resources including staff, surveillance, communications, and knowledge of risk factors that may contribute to the event of fall. There is a lack of focus on balance rehabilitation, fall prevention, and screening programmes in Pakistan. This practice is done only by some departments of JCIA accredited hospitals in Pakistan[4] but for improvement in elderly healthcare and disability prevention, this needs to implemented at all levels of healthcare. Multiple screening tools for fall risk assessment are available. These are either self-administered or can be utilized with minimum training. Usually used tools by practitioner are either self-reported or performance based tools for fall risk screening including Berg Balance Scale (BBS), Functional Reach Test (FRT), Timed up and go Test (TUG), Stopping Elderly Accidents, Deaths, and Injuries tool (STEADI), Morse Fall Scale (MSS) and Fall Risk Assessment Screening Tool (FRAST) etc.[7] Considering the lack of cross-cultural adaptation and validation in Urdu language of self-reported balance measure tools future research can be carried out to fulfill this need.

Technology integration in Balance Rehabilitation

In addition to integrating fall risk screening in clinical practice, utilization of latest technologies in healthcare system for fall detection and balance rehabilitation is still lacking in Pakistan. One such technology includes using smartwatches as fall detection and activity monitoring systems for elderly. Such wearable devices incorporate accelerometers, gyroscopes, pressure sensors, and barometric altimeters as inertial sensors to detect falls. These devices continuously monitor patient activity and can instantly identify falls, sound alerts and notify emergency services.[8] These smart watches are now widely available and should be utilized as one of the strategies to reduce the risk of falls in the elderly. Additional fall risk assessment and training tools include platform-based systems such as postural stability system mainly utilized for objective evaluation of fall risk, postural sway, neuromuscular control of balance, and integration of balance senses including visual, vestibular and somatosensory systems.[9] Additional systems also integrate force plates to evaluate center of gravity sways, lab-based systems including dynamic posturography systems, lab-based camera systems, and fusion systems that utilize low-cost video gaming technology such as platform system of Nintendo Wii or RBG camera-based system of Microsoft XBOX Kinect for balance assessment.[10]

Balance Rehabilitation strategies

Another aspect of fall prevention is early balance rehabilitation to improve postural stability and prevent events of falls. Older adults at low and moderate levels of fall risk must participate in fall prevention programmes and community-based exercises as per various clinical practice guidelines. Such rehabilitation programmes are recommended to enhance participation in community exercises as well as to address the modifiable risk factors for falls. Many balance exercise protocols are available including basic exercises challenging static and dynamic balance including internal protuberances via body movement such as looking up, looking down, turning to look over shoulder, weight shifting, multidirectional reaching out of base of support, etc., and external protuberances. Additionally, step training, single leg stance standing, and tandem walking have also been used previously.[11] Literature also suggests that aerobic exercises training in addition to conventional approaches results in significant improvement in not only balance but also cognition, quality of life, and muscle strength.[12] Aerobic activities can include brisk walking, treadmill walk, recombinant cycling, aerobics steps etc. In addition to these additional fall prevention strategies including ergonomic modification, appropriate assistive devices and evidence-based balance training regimes including flexibility training, strength training, and wobble board etc have been used.[3]

Another aspect to consider while recommending an appropriate balance rehabilitation programme is unique and individual need of each elderly person. As balance is influenced by multiple systems, usually participants require a custom balance rehabilitation programme. Customized home-based balance exercise programmes usually consist of a warm-up session followed by balance exercises and cool-down session. Customised exercise regimens are designed to train individual components of balance including visual, somatosensory, and vestibular aspects.[13]

With advancements in healthcare field, technology-based tools like dynamic posturography, and force plate systems are increasingly being used as they can target multisensory motor cognitive integrative and complex nature of balance. To assess postural response and adaptations, motor learning, and postural control mechanisms, dynamic posturography uses external perturbations or changing visual conditions to train

balance.[7]

Virtual Reality based Balance Rehabilitation

Virtual reality (VR) is an advanced type of technology - man interface that allows end users to interact in a computer-generated simulated surroundings or environment. A low-cost alternative to expensive VR equipment can be utilization of commercially available video games in order to provide dynamic balance training in different environments. Such devices include Microsoft XBOX Kinect and Nintendo Wii etc. Evidence suggests improvement in overall balance performance by the usage of video game-based exercise regimes.[14] VR-based regimes have additionally been used to improve reaction time by introducing artificial slip events in virtual environments hence highlighting the diversity of balance rehabilitation approaches using VR based regime.[15] Nonetheless utilization of any balance exercise regime will show a positive impact in contrast to lack of any intervention.

Capacity building in Balance Rehabilitation

One of the important factors to improve fall risk screening and balance rehabilitation in Pakistan is capacity building. The country needs to focus on the needs of the elderly and establish specialized healthcare training and education programmes with a focus on elderly care for all personnel of the healthcare team including rehabilitation medicine physicians, nurses, physical therapists, and other allied health professionals. There is also a need to establish specialized elderly care units and facilities with a focus on improving the elderly quality of life with a special focus on fall risk screening, balance and mobility training.

Conclusion

The component of health for all is still missing in Pakistan. The health care infrastructure of the country is underdeveloped and still prioritizes disease treatment rather than prevention them. Though the literature has significantly stressed the need for early balance rehabilitation and fall risk screening in elderly yet this component is lacking in Pakistan. Considering rapidly growing aged population and the significant health burden of fall-related injuries, healthcare workers and policymakers need to shift focus on this impending issue. For such, rapid screening tools can be used for fall risk screening during general physical examination of elderly and appropriate balance rehabilitation strategies and referral to specialized balance rehabilitation programmes can be integrated as part of holistic care.

References

1 Bashir S, Nazir S. Burden of Diseases among Elderly in Pakistan. Pakistan Institute of Development Economics; 2022.
2. Jalal S, Younis MZ. Aging and elderly in Pakistan. Ageing Int.. 2014;39:4-12.
3. Siddiqi FA, Azim ME. Elderly and Balance Rehabilitation: Current Dynamics & Future Possibilities for Pakistan. Found Univ J Rehab Sci. 2021;1:1-2.
4. Pidani AS, Ahmad T, Panjwani N, Noordin S. Prevention of falls in hospital: Audit report from a Tertiary care hospital of Pakistan. J Pak Med Assoc. 2021;71 (Suppl 5):S79.
5. Lee R. The CDC's STEADI initiative: Promoting older adult health and independence through fall prevention. Am Fam Physician. 2017;96:220.
6. Landis SE, Galvin SL. Implementation and assessment of a fall screening program in primary care practices. J Am Geriatr Soc. 2014;62:2408-14.
7. Renfro M, Maring J, Bainbridge D, Blair M. Fall risk among older adult high-risk populations: A review of current screening and assessment tools. Curr Geriatr Rep. 2016;5:160-71.
8. Wang Z, Ramamoorthy V, Gal U, Guez A. Possible life saver: A review on human fall detection technology. Robotics. 2020;9:55.
9. Dawson N, Dzurino D, Karleskint M, Tucker J. Examining the reliability, correlation, and validity of commonly used assessment tools to measure balance. Health Sci Rep. 2018;1:e98.
10. Baker N, Gough C, Gordon S. Classification of Balance Assessment Technology: A Scoping Review of Systematic Reviews. Information Technology Based Methods for Health Behaviours: Selected Papers from Global Telehealth 2019. 2020:45-59.
11. Siddiqi FA, Masood T, Azim ME, Malik AN, Babur MN. Training reduces fall risk and improves mobility among elderly: a randomized controlled trial. Rawal Med J. 2018;43:677-.
12. Raj NB, Lee WZ, Eswaramoorthi V, Razali H, Othman NYH, Rao U. Exercise programmes for reducing the risk of falls in elderly: A review. Res J Pharm Technol. 2020;13:2961-8.
13. Narita M, Islam MM, Rogers ME, Koizumi D, Takeshima N. Effects of customized balance exercises on older women whose balance ability has deteriorated with age. J Women Aging. 2015;27:237-50.
14. Azim ME, Siddiqi FA, Mirza SK, Pervaiz S, Amjad I, Malik AN. Effects Of Exergaming On Fall Risk Reduction And Mobility Improvement In Elderly: A Pre-Post Quasi Interventional Study. Int J of Rehabil Sci. 2017;6:
15. Osoba MY, Rao AK, Agrawal SK, Lalwani AK. Balance and gait in the elderly: A contemporary review. Laryngoscope Investig Otolaryngol. 2019;4:143-53.