Original Article

Prevalence Of Balance Disorders And Its Association With The Risk Of Falls In The Geriatric Population In Tertiary Care Hospitals Of Peshawar

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Abstract

Objective: To determine the prevalence of balance disorders and their association with the risk of falls in the geriatric population in tertiary care hospitals of Peshawar.
Study design: It is a descriptive cross-sectional survey study.
Place and duration of study: The study was conducted in some government tertiary care hospitals of Peshawar i.e., KTH, L.R.H, and HMC. The time duration for our research was 6 months i.e., from January to June 2023.
Material and Methods: The age of all participants was 65 or above. A total of 184 people participated in the research and among them there were 106 males and 78 females. For the collection of data, we used the Berg Balance Scale (BBS). The Berg Balance Scale (BBS) consists of 14 items and every point is marked from 0 to 4, where 0 is severe and 4 is normal. The total score on BBS was 56.
Results: A total of 25 males and 16 females lie between 0 to 20 and had high risks of falls. 129 people lie in 21 to 40 and had a moderate risk of falls. Among them, 70 males and 59 females have moderate risks of falls. Those people who had a mild risk of falls were 14 in number, and among them 11 were males and 3 were females.
Conclusion: We concluded that the senior population were affected by balance disorder and suffered from the risk of fall. In our study, the prevalence of risk of falls was higher in the male population than compared to the female population.

Keywords: Balance disorder, risk of falls, geriatric population.

1. Introduction

The elderly population or geriatric population was described simply as population/ adults aged 65 and above 65 years. The most common age that described a patient as a geriatric patient was 65 years. However, in the upcoming years, one-fifth of the global population was represented by elderly/ geriatric people.[1] The epidemiology showed that the ratio or section of people aged 65 or greater was increased twice. The increase in the ratio of geriatric rose from 7% up to 14%. The population count increased from 506 million individuals in 2008 to 1.4 billion individuals in 2040. At age 65 or above, the expectancy of life was increased. According to one of the reports published in the United States in 2003, a woman aged 65 may expect to live more than 19 years and a man may expect to live more than 16.8 years.[2] The color population would rise to 5 million by 2000, 10 million by 2010, and 20 million by the end of 2030. The white people of non-Hispanic areas made up almost 75% of the population, but they would only make up 35% of the growth in the population between 1990 and 2000. Between the years 2000 and 2010, this growth rate would fall up to 23%, and until 2030, the growth rate would fall up to 14%.[3]

Aging is the process of aging was simply a normal, biological process that was unavoidable. The exact starting of aging was unknown. No one knows exactly at which age the aging starts. About 3 and half billion years ago, the natural process of aging started.[4]

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The size, age distribution, health profile, and patterns of healthcare utilization of the population of the United States have undergone staggering shifts since the turn of the twentieth century. The United States population was more than 3 times in size as compared to its area. The population had gotten older, and nearly 13% of the population was over the age of 65, more than three times the percentage in 1900. Today over 70% of the population lives to the conventional retirement age of 65.[5]

Balance: The ability of an individual's body to gather signals such as proprioceptive and sensory signals in association with the position of the individual was termed balance. The body also could produce suitable motor responses in the body. These responses help the body to regulate the movement.[6] Even though balance or postural control is dependent on interactions between multiple systems, balance is crucial to mobility and stability. However, because of alterations in its components, the postural control mechanism becomes less effective as we get older. During balancing activities, it was reported that older adults' muscle response strategies change. The visual, somatosensory, and vestibular systems had also shown reduced function.[7] The stability from good posture was a procedure that includes the fast, programmed reconciliation of data from the vestibular, somatosensory, visual, and outer muscle frameworks, within the sight of cognition, which incorporates consideration and response time. Because of the damage/alterations in the vision, somatosensory, central nervous systems, vestibular, and musculoskeletal systems of the body, the loss of control of the body's posture results in poor balance. Among the geriatric population, because of these impairments, balance and stability were disturbed which results in a risk of falls.[8]

Aging and Balance Problem: The decrease in the balance problem was mostly related to aging. In younger age, the damage/ weakness in the balance can be found. This occurs due to a weak response of the sensory system when the most difficult is performed by a person. In the group of younger population, the balance problem may be occurring due to a reduction in the stability of human body posture. These declines in posture bring new challenges for an individual to maintain balance. With the decades, the process of declining in balance increases.[9]

Balance Disorder in Geriatric Population: The disorder of balance was most common among the older people/geriatric population. With the increase in fall risk, the balance issues can lead to different diseases. According to one estimate, the elder/ geriatric people which were one-third of the population may suffer from a disorder of balance, and some people complain about dizziness.[10] 1 out of 5 people around the globe was aged 70 years or above in 2020. The control of posture was the ability of a person to maintain balance and alignment in an upright/ anatomical position with the resistance of force of gravity. The control of posture is important for people because it helps in continuing daily life activities, which include maintaining balance and walking etc. The disruption or disabling of the sensory and motor components of the postural control system increases the likelihood of falls in older adults/ geriatric populations.[11]

Epidemiology of Falls: It was estimated that 13% of self-assessments of disturbing balance among adults aged between 65 and 69, and this proportion rises to 46% for those aged 85 and over. In correspondence to this, the prevalence of gait impairment in ambulatory older adults aged 70 years and older has been estimated at 35%. 28% was the estimated annual fall rate for adults over the age of 65.[9] As the US population ages, falls have become a higher priority in clinical and public health settings. About 30% of people over the age of 65 report that he or she fall at least once a year, and the two most common causes of falls in older adults are environmental disorders and gait/balance or muscle strength problems.[15] The ratio of deaths from falls in the U.S. for people over 85 years old was orders of magnitude higher than deaths among young people.[16] From 1992 to 1995, the United States saw 147 million visits to emergency rooms for injuries. Falls were the leading cause of external injuries, accounting for 24% of these visits. Children under the age of five and adults

65 and older were more likely to visit an emergency room because of a fall. Elderly people who fall were ten times more likely than children to be admitted to the hospital and eight times more likely to die from their injuries. Annually, 1,800 people die directly from falls. Every year, falls are linked to approximately 9,500 deaths among older Americans 14).

Diego Urrunaga-Pastor et al. (2018), conducted a study on factors associated with poor balance ability in older adults of nine high-altitude communities. The results from their study showed that the factors that were related to poor balance ability were consuming alcohol, gait speed, exhaustion, having at least 1 fall in the last year, having a minimum of 1 comorbidity, or having more than 1 comorbidity. So, they conclude that, among these communities, half of older people have poor balance ability.[17]

Suleiman I Sharif et al. (2018), conducted a study on the prevalence of falls among older adults aged 60 years and above to determine the risk factors associated with falls. The results from their study showed that participants whose age was 70 years or above 70 suffered from falls compared to their younger population. They conclude among the elderly population falls were most common, and such steps should be made that help decrease the ratio of falls.[18]

Tahsin Barış Değer et al. (2019) conducted a study on the prevalence of balance disorders, the effect of sociodemographic, medical, and social conditions on postural balance, and the relationship between balance and falls in the elderly. The result showed that (34.3%) was the prevalence of disorders of balance in the geriatric population. The different types of chronic diseases, disabilities, age, incontinence, disturbed gait along obesity were mostly associated with an increase in disorders of balance. They conclude that disorders of balance mostly occur in the geriatric population, and these balance disorders are due to multiple factors.[6]

Cyrus Cooper et al. (2016) conducted a study on the prevalence of falls by sex to examine cross-sectionally sex-specific associations between a range of potential risk factors and the likelihood of falling. The results showed that a minimum of one long-term disease along with severe pain have been diagnosed. In both genders, these diagnoses have a strong association with falls. The risk factors for weakness/ frailty and incontinence were diagnosed among the female population and older age people.[19]

2. Materials & Methods

The design of the study was a descriptive cross-sectional survey. The sampling technique was non-probability convenience sampling. The study setting was the government tertiary care hospitals of Peshawar i.e., KTH, L.R.H, and HMC. The time duration for our research was 6 months i.e., from January to June 2023. The Inclusion Criteria were Participants aged 65 and above, Both male and female participants, Participants with a previous history of at least one fall, Participants with previous balance/walking problems, and Exclusion Criteria were Participants with cognitive impairment, Malignancy, and TBI, Stroke patients and other neurological disorders, Drugs users which affect balance. Sample Size: With the anticipated frequency of 13.9%, a confidence interval of 95%, and a 5% margin of error, the sample size calculated through Open Epi was 184 people.

3. Results

Table 1 shows that both genders i.e., males and females participated in our study that was suffered from the risk of falls. For the gender-wise distribution of participants, the gender was coded as (1= male and 2= females). The total sample size in our data is 184 people among which 106 were males which was equivalent to (57.6%) and 78 were females which was equivalent to (42.4%) of the total sample size. The values from 0 to 20 show a high risk of falls among the geriatric population. The values from 21 to 40 show a moderate risk of falls while from 41 to 56 show there was a mild risk of falls among the population. A total of 184 people participated in the research and among them there were 106 males and 78 females. A total of 25 males and 16 females lie between 0 to 20 and had high risks of falls. 129 people lie in 21

to 40 and had a moderate risk of falls. Among them, 70 males and 59 females have moderate risks of falls. Those people who had a mild risk of falls were 14 in number. Among them 11 were males and 3 were females.

Table 1: Gender of Patient

Gender	Frequency	Percent
Male	106	57.6
Female	78	42.4
Total	184	100

Table 2 shows the risk of falls among the geriatric population. In this table, both males and females suffer from falls. The values from 0 to 20 show a high risk of falls among the geriatric population. The values from 21 to 40 show a moderate risk of falls while from 41 to 56 shows there was a mild risk of falls among the population. A total of 184 people participated in the research and among them there were 106 males and 78 females. A total of 25 males and 16 females lie between 0 to 20 and have high risks of falls which were 22.3% of the total percentage. 129 people lie 21 to 40 and have a moderate risk of falls. Among them, 70 males and 59 females have moderate risks of falls which were 70.1% of the total percentage. Those people who had a mild risk of falls are 14. Among them 11 are males and 3 are females which were 7.6% of the total percentage.

Table 2: The total score of Berg Balance Scale* Gender of patient

Risk of fall	Males	Females	Total	%
High risk of fall from 0 to 20	25	16	41	22.3
Moderate risk of fall from 21 to 40	70	59	129	70.1
Mild risk of fall from 41 to 56	11	3	14	7.6
Total	106	78	184	100

Table 3 shows the age of the patient and the total score on the Berg balance scale. 41 geriatric people suffered from a high risk of falls, 129 people suffered from a moderate risk of falls and 14 suffered from a mild risk of falls.

Table 3: The total score of Berg Balance Scale * Age of patient. Cross tab

	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	82	84	85	86	87	88	90	92	Total
High Risk of fall from 0 to 20	1	2	1	3	4	9	0	2	0	0	0	1	1	1	2	2	3	2	1	2	1	2	0	1	41
Moderate risk of fall from 21 to 40	12	12	16	15	7	13	7	7	3	4	7	3	3	5	4	6	3	0	0	0	0	0	2	0	129
Mild risk of fall from 41 to 56	5	2	1	0	2	0	1	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	14
Total	18	16	18	18	13	22	8	1	3	4	7	4	5	6	6	8	6	2	1	2	1	2	2	1	184

Table 4 shows the chi-square test values. The value of the Pearson chi-square test having asymptomatic significance on 2- 2-sided was 0.005. This means that the chi-square test showed a weak relationship between the two variables.

Table 4: Chi-Square Test

	Value	df	Asymptomatic significance (2- sided)
Pearson chi-square	74.723*	46	0.005
Likelihood ratio	77.741	46	0.002
Linear-by-linear association	20.632	1	0.000
N of valid cases	184		

a. 63 cells (87.5%) have an expected count of less than 5. The minimum expected count is .08.

4. Discussion

The rationale/ aim of our study was to find out the prevalence of balance disorder and its relationship with the risk of falls in the geriatric population of Peshawar. We included only those people in our study that were willing to participate. In terms of the selection of participants for our study, this was quite easy because we had to select only those people who had suffered from balance disorder or had walking problems and had a previous history of at least 1 fall. Since all the people selected for our study were of age 65 years or above. In our study, the risk of falls was calculated using the Berg Balance Scale (BBS). The (BBS) consists of 14 items and every item will be scored from 0 to 4. The score 0 shows the severity while 4 is normal. The total points of the BBS were 56. After collecting the data using BBS, we came to the result that among them some people were normal and had a mild risk of falls while most suffered from a moderate risk of falls, and some people suffered from a high risk of falls. According to (Khanuja K. et al. 2018), falls were the second leading cause of accidental injuries around the globe. These accidental injuries can cause deaths. For the geriatric population, falls were the major health issue. Around half of the people living in care institutions of the community and one-third of the population experience falls every year.[12]

(Suleiman I Sharif et al. in 2019), conducted a study on the prevalence of falls among older adults aged 60 years and above and to determine the risk factors associated with falls. For their study, they selected 510 families. Each family member had a minimum of 1 geriatric person and had experience in the last 1 -2 years. The result showed that 50.8% of the participants had experienced falls in the last 2 years. In their study, most falls occur among women and people aged 70 years or greater but in our study, the male population of 65 or above are most likely to experience falls compared to the female population. Hence, this study supported our study because in both studies' the geriatric population experienced risks of falls.[18]

(RE Criter et al. in 2016), conducted a study on identifying balance measures most likely to identify recent falls. A total of 30 people were selected for the study and their age on average was 77.2 years. In their study, the geriatric population with balance issues had a greater rate of falls and fear of falling compared to other people. In our study, both males and females suffered from balance disorder and had risks of falls. So, this study supported our study.[13]

Conclusion:

In our descriptive cross-sectional study, we examined balance disorder and its association with the risks of falls in the geriatric population. According to the study, balance issues among the elderly population raised their chance of falling. Notably, within the geriatric group, the study found that males had a higher prevalence of fall hazards than females. The results point to the need for focused treatments and additional studies to identify the precise mechanisms underlying the observed variations in fall risk between genders.

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