

The Frequency of Elderly Patients with Diabetes Type II Having Risk of fall and Impaired Balance; A Cross Sectional Survey

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ABSTRACT

Background: Diabetes Mellitus type 2 causes multiple complications like peripheral neuropathy, retinopathy and vestibulopathy. Diabetic neuropathy was one of the very common and long-term complications of DM which worsen throughout time. Postural variability and balance illness were mutual findings in DN due to lessened proprioception.

Objective: The objective was to determine the frequency of elderly patients with diabetes type II having risk of Fall and impaired Balance.

Methods: It was a cross sectional study. The Sample size was 133 participants surveyed through convenient sampling technique. Total time from May to October 2021 was utilized for study. Berg Balance Scale was used to determine the risk of fall in older adults having diabetes mellitus type 2. Participants were appearing for assessment for once. Data was analyzed on SPS Sversion 25.

Results: The result showed that 76.7% patients were independent in their daily life activities. The results of our study were that total 23.3% patients were at the risk of fall. The means and standard deviation of total score of Berg Balance Scale was found to be 44.49±10.48.

Conclusion: Based on findings of study it was concluded about one fourth of patients were at risk of fall and impaired balance. The adverse effects associated with diabetes mellitus like retinopathy, vestibulopathy and diabetic neuropathy may contribute to worsening balance and fall risk.

Keywords: Vestibulopathy, Berg Balance Scale, Diabetic Neuropathy, Balance Impairment, Retinopathy

INTRODUCTION

Diabetes mellitus is a complex metabolic disorder. Diabetes mellitus cause problem when insulin does not produce by pancreas in body for a prolong duration of time. DM categorized into Type 1, type 2 and gestational DM.(1, 2) In type 1 DM insulin is not produced in body therefore it is called as insulin dependent DM. Weight loss, thirst, excess amount of urination and fatigue are common symptoms of type 1 DM.(3) In type 1 DM insulin is injected into blood stream to reduce the level of glucose. Patient of type 1 DM can survive only when take regular dose of insulin without insulin survival is impossible. Type 1 DM occurred in early age. Type 2 DM is occurred in late stage of life, and it can be non-insulin dependent. Obesity and lack of regular exercises, lack of proper diet is common cause of type 2 DM. The symptoms of type 2 DM are just like type 1 DM.(4)

Diabetes mellitus cause multiple complications in patients like peripheral neuropathy, retinopathy etc. An unknown, vestibular system is affected by the complications of diabetes; according to recent study vestibular system dysfunction is 70% higher in diabetic patient as compared to non-diabetic patients.(5) The risk of fall was more in older adults having DM type 2 than those older adults which didn't have diabetes. The harmful effect of falls includes decrease in mortality, movement, and action. The risk of fall in diabetic patients is associated with diabetic peripheral neuropathy.(6)

Diabetic neuropathy (DN) is the very common and for a large period effect of diabetes. Increased reaction time and decreased proprioception are some of the reasons for postural instability.(7) Growing age, history of fall, DN, deformity of posture, and uncontrolled sugar level are the affective factors of fall in older adults. For its prevention balance training with Berg Balance Scale (BBS) has a useful effect in stability of DN linked postural unsteadiness. Although it is important to observe the patients with DPN for disorders which may contribute to damage and skin deformity due to exercise or movement-based interventions but the essential role of such exercise interventions to prevent or slowdown progression this condition is also evident.

Diabetes is the leading cause of disability and death. Gait is commonly disturbed in diabetic older adults due to which risk of fall

and disability is common. Gait is depending on integration of cardiorespiratory system, cognitive system, musculoskeletal and vestibular system. Diabetes mellitus cause complications of cardiorespiratory, cognitive, and vestibular system due to which risk of fall is increased. Therefore, Diabetes is associated with reduced physical activity, disability, and increased risk of fall.(8)

B. Cole et al. in 2020 studied to determine the diabetes mellitus and types of diabetes mellitus. It showed a continuously increasing incidence of diabetes mellitus.(9) While another study conducted to determine the long-term complication of DM which showed number of complications like molecular, vascular, and neural which were caused by diabetes mellitus - induced hyperglycemia.(10)

Nanayakkara et al., studied in 2021 to evaluate the association between type 2 DM and its long-term consequences. It was concluded that younger adults in comparison to older adults have high risk of diabetes mellitus related micro and macro vascular complications because in later age diabetes already diagnosed and preventive measures of diabetes related complications are being taken therefore risk of micro vascular and macro vascular complications are decreased. While another study conducted to assess the sensory loss of foot, risk of fall and fall related injuries in diabetic older adults. It was concluded that sensory loss of foot correlates significantly with balance impairment and risk of fall. Another study conducted to evaluate the effect of DM on vestibular system which will become a reason of fall in older adults. In study total 1365 patients participated. The result of their study was that hyperglycemia caused 'benign paroxysmal positional vertigo' which is a common abnormality of vestibular system. Therefore, they concluded that there was a connection between hyperglycemic fault and vestibular system abnormality.(11)

Xiaojie Wang et al. studied in 2020 to determine the link between frailness and fall risk in individuals having diabetes mellitus. It was an observational study. Frailty status was measured by a Frailty Index. Total 2049 patients participated in study. The study concluded that there was association between fragility and risk of fall in population having diabetes mellitus.(12) In short, the literature showed that diabetes mellitus may impact a

person's balance capacity which may lead to greater risk of fall. Therefore, the study was conducted to determine the frequency of elderly patients with diabetes type II having risk of Fall and impaired Balance.

METHODOLOGY

The study was descriptive cross-sectional survey and non-probability convenient sampling technique was used. This study was conducted at Govt. Kot Khawaja Saeed Teaching Hospital, KEMU, Lahore. The study was completed in 6 months after the approval of synopsis. Patients with age > 45 years diagnosed with DM type 2 from last 5 years while patients with associated diagnosed neurological abnormalities or having any fracture or surgery in lower extremity were excluded. An informed consent was taken, and patients were appearing once for assessment. Berg Balance Scale questionnaire was used to collect the data for assessment Berg Balance scale is a "14 item-scale" design to measure balance in older adults in a clinical setting. A five-point ordinal scale, "ranging from 0-4". "0" specifies the minimal functional level and "4" shows the level of maximum working. Total score of berg balance scale was 56. It was highly reliable and valid tool.

RESULTS

Table 1:

Categorical variables			
Variable	Sub-Variable	Frequency	Percentage
Gender	Male	63	47.4
	Female	70	52.6
Onset	5-10 years	96	72.18
	11-15 years	23	17.29
	>15 years	14	10.53
Berg Balance Scale	Wheelchair Bounded	7	5.26
	Walking with Assistance	24	18.05
	Independent	102	76.69
Continuous Variables			
	Mean	Standard Deviation	
Age	55.09	7.56	
BBS Score	44.49	10.486	

Results regarding categorical variables included gender; the frequency 63 (47.4%) males, 70 (52.6%) females, onset of disease since 5-10 years 96 (72.18%), 11-15 years 23 (17.29%) and > 15 years 14 (10.53%), berg balance scale variable subjects including wheel chair bounded 7 (5.26%), walking with assistance 24 (18.05) and independent 102 (76.69%) were found. Whereas results regarding continuous variables included age mean 55.09+ SD 7.56 and BBS score mean 44.49 + 10.486.

DISCUSSION

The study conducted in December 2019, to assess the sensory loss of foot, risk of fall and fall related injuries in diabetic older adults. It was concluded that sensory loss of foot correlates significantly with balance impairment and risk of fall while comparing to another study about effect of DM on vestibular system which will become a reason of fall in older adults. It was concluded that there was a connection between hyperglycemic fault and vestibular system abnormality.(13, 14) One study conducted to assess the impairment of vestibular system and balance control in patients having DM. The results of their study were that 56.7% patients with DM type 2 had vestibular system impairment. They concluded that incidence of vestibular system and balance control impairment increased with type 2 DM due to which risk of fall was increased.(15) Whereas another study conducted to assess the complication of DM type 2 later which cause balance impairment. It was concluded that retinopathy and vestibulopathy was also a major reason of balance loss in diabetic patient.(16) One of the recent studies showed the association

among chronic condition of diabetes mellitus and balance impairment and it was concluded that elderly adults having DM were a targeted group of balance impairment.(17)While another study conducted to determine that hypoglycemia in older adults having diabetes mellitus type 2 contribute to increased risk of fall and it was concluded that sever hypoglycemia was caused increased wagerof balance disturb in elders having DM.(18)

The study conducted to assess the relationship among foot sensation, balance loss, risk of fall and patients having DM and it was concluded that the degree of sensory loss correlates with balance loss and risk of fall.(19) Whereas assess the impact of proprioceptive exercise with balance training exercises in community dwelling individuals having diabetes mellitus and it was concluded that, proprioceptive exercise was a most important part of balancetraining program to gain best results of balance control in individuals having diabetes mellitus.(20)

CONCLUSION

Based on findings of study it was concluded about one fourth of patients were at risk of fall and impaired balance. The adverse effects associated with diabetes mellitus like retinopathy, vestibulopathy and diabetic neuropathy may contribute to worsening balance and fall risk.

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