

A Comparative Study to Assess Risk of Fall among Diabetic and Non Diabetic Elderly Patients in Selected Hospital of District Hoshiarpur, Punjab

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ABSTRACT

Background of study:

Diabetes mellitus is common among elderly persons, with several potential complications that could contribute to falls. Previous studies suggested that there is more prevalence of fall among diabetic elderly patients as compared to non-diabetic elderly.

Aim of the study

The aim of this study is to assess the risk of fall in elderly diabetic and non-diabetic patients.

Material and methods: A quantitative research approach and non-experimental (comparative) research design was used. Total 60 elderly were selected (30 diabetic elderly and 30 non-diabetic elderly) by non-probability purposive sampling technique. Data were collected by using Timed Up and Go test to assess the risk of fall in non-diabetic and diabetic elderly patients. Analysis was done using both descriptive and inferential statistics.

Findings

In non diabetic group 46.66% elderly were having medium risk of fall, 33.33% were independent individuals and only 20% were having high risk of fall. Where as in diabetic patients majority 70% were having high risk of fall, 20% medium risk of fall and only 10% patients observed as independent individuals. The mean time taken to complete Timed up & go (TUG) test among diabetic elderly was more i.e. 23.36 sec. as compared to non diabetic elderly (14.13) and the difference was found to be statistically significant at $p < 0.05$.

Conclusion

The risk of fall is significantly increased among diabetic patients as compared to non-diabetic elderly patients. In order to reduce falls and their consequences, assessment of fall risk will be beneficial for identifying the high risk population, which will help nurses provide tailored advice and interventions for the high-risk population.

Background

The number of elderly people within a population is increasing worldwide especially in developing countries. Falls are a major problem in the elderly because they cause significant morbidity and mortality. This is due to complications arising from falls causing a significant decrease in functional status, serious injury, and increased utilization of medical services. Diabetes mellitus (DM) is highly prevalent in older people. The current burden of diabetes is greatest in the population ≥ 65 years of age,

where more than half of direct medical expenditures were on diabetes. As diabetes increasingly becomes a disease of elderly people, some of its related complications must be addressed. These include cognitive disorders and physical disability, falls and fractures, and other geriatric syndromes in the elderly.¹

Diabetes mellitus (DM) type 2 is one of the most frequently diagnosed chronic diseases, affecting more than 300 million people worldwide and is

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KEYWORDS: Elderly, Diabetes, Risk of fall

independent of the degree of development of the country. Approximately 20% of adults between 65 and 76 years have a diagnosis of DM2.² The current global prevalence of type 2 diabetes mellitus is about 150 million persons, and this is expected to reach 300 million persons by the year 2025. Diabetes mellitus is a very common disease among elderly persons, afflicting about 20% of older adults aged 65–75 years and 40% of adults 80 years old.³ By the year 2050 the elderly population is expected to reach 88.5 million, which would represent 20% of the total population. The significance of the relationship between aging, DM and falls has been highlighted by previous work that found the annual incidence of falls in elderly individuals with DM to be 39%.⁴

In this regard, and in light of the irrefutable evidence of the many negative consequences of falls among the elderly, a considerable body of research has been directed towards the identification of remediable or changeable risk factors that can be harnessed to potentially prevent falls among this population. Among these factors, visual impairments, inappropriate eyewear usage, psychoactive medication overuse, prevailing difficulties with gait and balance, co-morbid conditions and being underweight or overweight with severe polyneuropathy are highly implicated. Other documented risk factors for falls include physical frailty, physical inactivity, alcohol misuse, cognitive and sensory impairments, poor health and functional status.⁵

The growth of the elderly population is a phenomenon observed in most countries including Brazil. Ageing is a physiological and dynamic process, where changes in the ability of homeostatic adaptation occur and thereby eliminate some of the stages of postural control, leading to an increased instability. However, ageing associated to a disease such as diabetes mellitus progressively leads the individual to further damage. Diabetes mellitus is a syndrome of multiple etiologies, resulting from the lack of insulin and/or the inability of this hormone to properly exert its effects, which may lead to the development of associated diseases and complications such as retinopathy, nephropathy, peripheral neuropathy, loss of joint mobility and muscle strength. Moreover, cognitive function also seems to become altered in individuals with diabetes mellitus.⁶

It is estimated that by 2025, the world population of diabetics will double when compared to the existing number of diabetics in 2000 (from 150 million to 300 million). Elderly with type 2 diabetes mellitus are more likely to present some cognitive deficits when compared to those without this disease.⁶

OBJECTIVES

1. To assess risk of fall among elderly non diabetic patients.
2. To compare risk of fall among diabetic and non diabetic elderly patients.
3. To compare risk of fall among diabetic and non diabetic elderly patients.
4. To find out association of risk of fall among diabetic and non diabetic elderly patients with selected demographic variables.

Materials and Methods

A quantitative research approach and non-experimental (comparative) research design was used. Total 60 elderly were selected (30 diabetic elderly and 30 non-diabetic elderly) by non-probability purposive sampling technique. Data were collected by using Timed Up and Go test to assess the risk of fall in nondiabetic and diabetic elderly patients. Analysis was done using both descriptive and inferential statistics. The study was conducted in OPD section of Civil Hospital, Hoshiarpur, Punjab, which is a 250 bedded multi-speciality hospital providing medical, nursing and quality diagnostic services to a large number of people in the city. The outpatient department of the department of medical –surgical where the study was conducted has in average a daily turnover of 200 patients.

TOOL

There were 2 instruments that were used in the study for data collection. Tool 1 consisted of questions related to the participants socio-demographic characteristics and had 9 items. Tool 2 was Timed up and Go test to assess the risk of fall. The patient should have one practice trial that is not included in the score. The Criterion measure for this test was if elderly take <10 sec considered under Independent individual, between 10-20 sec medium risk of fall and >20 sec considered under high risk of fall. The necessary ethical clearance was obtained from the research settings before data collection.

RESULTS**A. Socio demographic characteristics of participants.**

Sample characteristics	Non diabetic		diabetic		Df	χ^2
	n	%	n	%		
1. Age (in years)						
a) 60-65 years	15	50	10	33.33	3	4.52 ^{NS}
b) 65-70 years	8	26.6	13	43.33		
c) 70-75 years	7	23.33	5	16.66		
d) 75-80 years	0	0	2	6.66		
2. Gender						
a) Male	18	60	20	66.66	1	0.28 ^{NS}
b) Female	12	40	10	33.33		
3. Family income(in Rs)						
a) ≤ 10000	9	33.33	8	26.66	3	1.04 ^{NS}
b) 10001-20000	13	43.33	11	36.66		
c) 20001- 30000	4	13.33	7	23.33		
d) >30000	4	13.33	4	13.33		
4. Occupation						
a) Nil	10	33.33%	6	20.0%	4	6.09 ^{NS}
b) Private job	0	0	5	16.66		
c) Govt.job	11	36.66	11	36.66		
d) Own business	6	20	5	16.66		
e) Retired	3	10	3	10		
5. BMI						
a) Underweight	0	0	0	0	2	16.5*
b) Normal	12	40	22	73.33		
c) Overweight	16	53.33	8	26.66		
d) Obese	2	6.66	0	0		
6. Duration of disease (In years)						
a) ≤5			14	46.66	3	
b) 5-10			9	30.00		
c) 10-15			2	6.66		
d) ≥ 15			5	16.66		
7. Level of physical activities						
a) Sedentary	0	0	3	10	4	10.1*
b) Underactive	0	0	4	13.33		
c) Under active regular light activities	9	30	10	33.33		
d) Under active regular	3	10	4	13.33		
e) Active	18	60	9	30		
8. Co-morbid condition						
a) Hypertension	11	36.66	14	46.66	6	9.66 ^{NS}
b) Cardiovascular	4	13.33	7	23.33		
c) Respiratory	4	13	7	23.33		
d) Gastrointestinal	0	0	0	0.0		
e) Genitourinary	4	0	2	6.66		
f) Any other/(Specify)	0	23.33	0	0		
g) None	7		0	0		
9. History of fall						
a) Yes	2	6.66	9	30.0	1	5.45*
b) No	28	93.33	21	70.0		

According to age group, 50% non-diabetic elderly were in age group of 60-65 years and 23.33% were in age group of 70-75 years. On the other hand, 43.33% of diabetic elderly patients belonged to age group 65-70 years and least 6.66% subjects were in age group of 70-75 years. • In non-diabetic and diabetic elderly group maximum 60% and 66.6% were male respectively. • 43.33% of non-diabetic elderly had Rs 10,001-20,000

/month family income. Both ranges of family income i.e. between Rs.20,000-30,000 were having 13.33% of subjects. Whereas among diabetic elderly patients 36.66% were having family income between 10,001-20,000 and minimum i.e. 13.33% elderly were having family income \geq Rs 30,000. • According to occupation, same percentage (36.66) of non-diabetic elderly and diabetic elderly were having Government job and minimum i.e. 10% were retired in both group. • 53.33% non-diabetic elderly were overweight and 6% patients were obese. On the contrary, maximum 73.33% diabetic elderly were normal weight and minimum i.e. 26.66% were overweight. • 46.66 of elderly patients were suffering from diabetes from \leq 5 years and lowest percentage 6.66 from 10-15 years. • In non-diabetic maximum 60% of elderly were active and 10% patients were under active regular. On the other hand in diabetic patients 33.33% were under active regular light activities and both category of level of physical activities i.e. under active and underactive regular was having 13.33 subjects. • According to co-morbidity, 36.66% of non-diabetic elderly were having hypertension and lowest 13.33% each were having cardiovascular, respiratory and genitourinary co-morbidity, but in diabetic patients 46.66% subjects of hypertension and each 23.33% subjects had cardiovascular and respiratory comorbidity. • Maximum i.e. 93.3% of non diabetic elderly and 70% diabetic elderly had no history of fall.

Findings

Objective-1 To assess the risk of fall among diabetic elderly patients.

Objective-2 To assess the risk of fall among non-diabetic elderly patients.

Table-2 Frequency and percentage distribution of diabetic and non- diabetic elderly patients according to level of risk of fall.

N=60

Risk of fall	Criterion	Non diabetic		diabetic	
	Measure	n	%	n	%
Independent individual	<10 sec	10	33.33%	3	10%
Medium risk of fall	Between 10-20 sec	14	46.66%	6	20%
High risk of fall	>20 sec	6	20%	21	70%

Table-2 shows the frequency and percentage distribution of diabetic and non-diabetic elderly patients according to risk of fall as per Timed Up and Go test. In non diabetic group 46.66% elderly were having medium risk of fall, 33.33% were independent individuals and only 20% were having high risk of fall. Where as in diabetic patients majority (70%) of patients were having high risk of fall, 20% were having medium risk of fall and only 10% patients observed as independent individuals.

Thus, it can be concluded that diabetic elderly patients have high risk of fall as compared to non-diabetic elderly.

Objective-3 To compare risk of fall among diabetic and non-diabetic elderly patients

H₀: There is no statistically significant ($p < 0.05$) difference in risk of fall among diabetic and non-diabetic elderly patients.

H₁: The risk of fall is significantly ($p < 0.05$) increased among diabetic patients as compared to non-diabetic elderly patients.

Table-3 Comparison of risk of fall among diabetic and non-diabetic elderly patients.

Groups	N	Mean (secs)	SD	Df	Test value
Non diabetic-elderly	30	14.13	6.71	58	T = 4.80*
Diabetic elderly	30	23.36	8.15		

*Significant at $p < 0.05$ level of significance

Table -3 depicts that mean score of risk of fall among diabetic elderly was more i.e. 23.36 sec. as compared to non diabetic elderly (14.13).

The difference between mean score of risk of fall among diabetic and non-diabetic elderly has been found to be statistically significant at $p < 0.05$ level of significance.

So, null hypothesis is rejected that there is statistically significant difference in risk of fall among non diabetic and diabetic elderly patients and alternative hypothesis is accepted that the risk of fall is significantly ($p < 0.05$) increased among diabetic patients as compared to non -diabetic elderly patients.

Objective-4 To find out association of risk of fall among diabetic and non-diabetic elderly patients with selected demographic variables.

Table -5 Association of risk of fall among diabetic and non-diabetic elderly patients with selected demographic variables.**N=60**

Non-diabetic Diabetic										
Demographic variable	n	Mean (secs)	SD	Df	Test value	n	Mean (secs)	SD	df	Test Value
1. Age(in yrs)										
a) 60-65	15	9.26	2.43	3	F=36.42*	10	16.6	7.86	3	F=6.56*
b) 65-70	8	14.5	3.71	2		13	25.07	6.02		
c) 70-75	7	24.1	0	27		5	31.4	4.33		
d) 75-80	0	0	0	27		2	26.0	5.65		
2. Gender										
a) Male	18	13.33	7.07	18	t=0.81 ^{NS}	20	22.5	8.56	20	t=0.86 ^{NS}
b) Female	12	15.33	6.24	12		10	25.1	7.38	10	
3. Family income(in Rs)										
a) ≤ 10000	9	10.55	7.14	3	F=1.62 ^{NS}	8	24.12	7.19	3	F=1.21 ^{NS}
b) 10001-20000	13	16.76	6.61			11	25.36	7.27		
c) 20001-30000	4	13.5	6.45			7	23.28	9.42		
d) ≥30000	4	14.25	3.86			4	16.5	9.46		
4. Occupation										
a) Nil	10	13.1	7.78	3	F=0.78 ^{NS}	6	23.5	7.50	4	F=0.16 ^{NS}
b) Private job	0	0	0			5	21	11.64		
c) Govt.job	11	13.27	5.15			11	24.45	9.39		
d) Own business	6	14.16	5.87			5	22.4	4.97		
e) Retired	3	20.66	9.45			3	24.66	6.11		
5. BMI										
a) Underweight	0	0	0	2	F=0.28 ^{NS}	0	0	0	1	F=0.28 ^{NS}
b) Normal	12	14	7.26			22	22.5	8.07		
c) Overweight	16	13.68	6.76			8	25.75	8.44		
d) Obese 30 or higher	2	18.5	0.70			0	0	0		
6. Duration of disease(in yrs)										
a) <5						14	20.0	9.02	3	F=1.87 ^{NS}
b) 5-10						9	25.22	6.79		
c) 10-15						2	30.5	6.36		
d) >15						5	26.6	5.41		
7. Level of physical activities										
a) Sedentary	0	0	0	2	F=10.47*	3	31.66	2.88	4	F=6.59*
b) Underactive	0	0	0			4	29	5.71		
c) Underactive regular light activities	9	21.0	4.89			10	24.6	5.68		
d) Under active regular	3	19	9.53			4	26.75	7.36		
e) Active	18	9.88	2.60			9	15.22	6.81		
8. Comorbid condition										
a) Hypertension	11	16.90	6.33	4	F=1.64 ^{NS}	14	24.71	8.87	3	F=0.13 ^{NS}
b) Cardiovascular	4	13.75	4.71			7	21.0	8.66		
c) Respiratory	4	18.75	9.74			7	24.28	5.55		
d) Gastrointestinal	0	0	0			0	0	0		
e) Genitourinary	4	11.5	7.18			2	19.0	12.7		
f) Any other	0	0	0			0	0	2		
g) None	7	8.85	1.21			0	0	0		
9. History of fall										
a) Yes	2	23	7.07	28	t=1.84 ^{NS}	9	26.88	5.01	28	t=2.09*
b) No	28	13.5	6.35			21	21.57	8.77		

* Significant at p < 0.05 level of significance

NS =Non significant at $p < 0.05$ level of significance

Table -5 depicts the association of risk of fall among diabetic and non-diabetic elderly patients with selected socio-demographic variables.

Hence, it can be inferred from the table that gender, family income, occupation, BMI, duration of disease and co-morbid condition has statistically non-significant relationship with risk of fall among non-diabetic and diabetic elderly patients at $p < 0.05$ level of significance. On the other hand, age, level of physical activity and history of fall in diabetic patients have statistically significant relationship at $p < 0.05$ level of significance.

DISCUSSION

Falls are a major problem in the elderly because they cause significant morbidity and mortality. This is due to complications arising from falls causing a significant decrease in functional status, serious injury, and increased utilization of medical services. Diabetes mellitus (DM) is highly prevalent in older people. The current burden of diabetes is greatest in the population ≥ 65 years of age, where more than half of direct medical expenditures were on diabetes. As diabetes increasingly becomes a disease of elderly people, some of its related complications must be addressed. These include cognitive disorders and physical disability, falls and fractures, and other geriatric syndromes in the elderly.

In this study, 46.66% non-diabetic elderly were having medium risk of fall and 33.33% were independent individuals and only 20% were having high risk of fall. Where as in diabetic patients 70% were having high risk of fall, 20% were having medium risk of fall and only 10% patients observed as independent individuals. Above findings showed that diabetic elderly patients have high risk of fall as compared to non diabetic elderly.

In the present study, mean score taken to complete Timed up & go (TUG) test among diabetic elderly was more i.e. 23.36 sec. as compared to non diabetic elderly (14.13). The difference between mean score of risk of fall among non-diabetic and diabetic elderly has been found to be statistically significant at $p < 0.05$ level of significance.

In the present study, according to age, the mean score of risk of fall among non diabetic and diabetic elderly is (24.14 and 31.4) in the age group 70- 75 years. There was statistically significant relationship at $p < 0.05$ between mean score of risk of fall and age in both groups. So, age has significant impact on risk of fall among non-diabetic and diabetic elderly patient. The study findings are similar to the findings of the study conducted by Azidah AK, Hasniza H and Zunaina E which revealed that the elderly within the age group of more than 75 years old were found to be at a higher risk of falls in this study.¹

The findings of present study according to level of physical activities, there was statistically significant

relationship at $p < 0.05$ between risk of fall and level of physical activities. So, level of physical activities has significant impact on risk of fall among non-diabetic and diabetic elderly patients

Conclusion

The risk of fall is significantly (at $p < 0.05$ level of significance) increased among diabetic patients as compared to non -diabetic elderly patients.

LIST OF REFERENCES

- [1] Azidah K, Hasniza H, and Zunaina E. Prevalence of falls and Its Associated Factors among Elderly Diabetes in a Tertiary Center, Malaysia. Current Gerontology and geriatric research. 2012; <http://www.ncbi.nlm.nih.gov/pmc>. reviewed on 28/4/2014
- [2] Mantovani et al. Risk of Falls in People with Diabetes Mellitus. International Journal of Diabetes Clinical Research 2015; 2(4) ISSN: 2377-3634
- [3] Maurer MS, Burcham J, and Cheng H. Diabetes Mellitus Is Associated With an Increased Risk of Falls in Elderly Residents of a Long-Term Care Facility. Journal of Gerontology. 2005; 60A.(9.): 1157–1162.
- [4] Marks R, Falls Injuries and Type 2 Diabetes: Background and Future Directions. Austin Journal of Endocrinology and Diabetes. 2014; 1(4): 1016.
- [5] Patrícia P, Daniele SA, Daniela P, Anjos MC. Functional mobility and executive function in elderly diabetics and non-diabetics. Brazilian journal of physical therapy. 2010; 14 (6) : <http://dx.doi.org/10.1590>.
- [6] Teresa A, Hillier, Deborah E, Sellmeyer, Helaine E and Resnick. Older Women With Diabetes Have a Higher Risk of Falls. BMJ open diabetes research and care. 2002; 25(10):1749-1754.
- [7] Oliveira D, Fachin SM, Jozatti J, Ferreira MO and Paola L. Comparative analysis of risk for falls in patients with and without type 2

- diabetes mellitus . Rev. Assoc. Med. Bras. 2012; 58 (2)
- [8] Cordeiro RC, Jardim JR, Perracini MR, and Ramos LR. Factors associated with functional balance and mobility among elderly diabetic outpatients. *Arq Bras Endocrinol Metab.* 2009;53(7):834-43.
- [9] Lamb SE, McCabe C, Becker C, Fried LP, Guralnik JM. The optimal sequence and selection of screening test items to predict falls risk in older disabled women: the women's health and aging study. *J Gerontol A Biol Sci Med Sci.* 2008;63(10):1082-8
- [10] Basheer PS and Khan YS. *A concise Text Book of Advanced Nursing Practice.* 1st ed. Bangalore: Emmess Medical Publishers 2012; 421-424.
- [11] Tilling LM, Darawil K and Britton M. Falls as a complication of diabetes mellitus in older people. *Journal of Diabetes and its Complications.* 2006; 20(3): 158–162.
- [12] Hillier TA, Sellmeyer DE, Resnick E, Gregg E, Ensrud E, Schreinger PJ, Margolis KL, Cauley JA, Nevitt MC, Black DM and Cummings SR. Older women with Diabetes have a higher risk of falls. 2005; 25(10): 1749-54.
- [13] Maurer MS, Burcham J and Chenq H, Diabetes mellitus is associated with an increased risk of falls in elderly residents of a long-term care facility. *J gerontol A Bilol Sci Med Sci.* 2005; 60(9):1157-62.
- [14] Oliveira D, Fachin SM, Jozatti J, Ferreira MO and Paola L. Comparative analysis of risk for falls in patients with and without type 2 diabetes mellitus . Rev. Assoc. Med. Bras. 2012; 58 (2): <http://dx.doi.org/10.1590>.
- [15] Sai AJ, Gallagher JC, Smith LM and Logsdon S. Fall predictors in the community dwelling elderly: a cross sectional and prospective cohort study. *J Musculoskelet Neuronal Interact.* 2010; 10(2): 142-50.
- [16] Quandt SA, Stafford JM, Bell RA, Smith SL, Snively BM, Arcury TA. Predictors of falls in a multiethnic population of older rural adults with diabetes. *Journals of Gerontology.* 2006; 61(4): 394–398.
- [17] Rubenstein LZ, Josephson KR and Robbins AS. Falls in the nursing home. *Annals of Internal Medicine.* 1994; 121(6): 442–451.
- [18] Evelien P, Ferreir I, Renate T, Jongh D, Dorly J, Deeg, Lips P, Coen D, Stehouwer A and Arie. Older individuals with diabetes have an increased risk of recurrent falls analysis of potential mediating factors, the Longitudinal Ageing Study. *Age and Ageing.* oxford journals.org. 2012; 41(3): 358-365.
- [19] Schwartz AV, Vittinghoff E, and Sellmeyer DE. Diabetes-related complications, glycemic control, and falls in older adults. *Diabetes Care.* 2008; 31(3): 391–396.
- [20] Gregg EW, Beckles GLA and Williamson DF. Diabetes and physical disability among older U.S. adults. *Diabetes Care.* 2000; 23(9): 1272–1277.