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Research Article

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Risk of Falling Among Elderly and Its Relation to Quality of Life

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ABSTRACT

Risk of falling is commonly reported among older adults and can impact negatively on physical and social activities, mood and quality of life. A differential research design employed to know the effects of age, gender and socio-economic status on risk of falling among 480 elderly revealed that risk of falling was significantly higher among older elderly (75 years and above) compared to young old (60-74 years) in both the regions of Northern Karnataka and Upper Assam. In urban area of Northern Karnataka region, 75.0 per cent of young old were with while medium risk of falling whereas 65.0 per cent of the older elderly had high risk of falling. In rural area, both young old (53.3%) and older elderly (50.0%) were at high risk of falling. In rural Upper Assam region, both young old (80.0%) and older elderly (52.0%) had medium risk of falling, whereas, in urban area, 94.3 per cent of the young old were at medium level of risk of falling, while 75.8 per cent of the older elderly had high risk of falling. Gender and socio-economic status did not influence the risk of falling in both the regions. Significant association was noticed with risk of falling and quality of life among elderly of rural northern Karnataka. The tools used were Global Physical Activity Questionnaire- subscale Risk of Falling developed by WHO (2005), Older People's Quality of life Questionnaire (OPQOL-35) developed by Bowling (2009) and Socio-economic status developed by Aggarwal et al. (2005).

Keywords: *Risk of falling, Quality of life, Gender and Socio-economic status*

INTRODUCTION

According to the World Health Organization (WHO), falls are the second leading cause of deaths in the world due to accidental or unintentional injury. Falls are one of the most common and problematic issues among older adults (American Geriatrics Society, British Geriatrics Society, & American Academy of Orthopedic Surgeons Panel on Falls Prevention, 2001; Li et al., 2003). Older adults (≥65 years) suffer the greatest number of fatal falls (WHO, 2016) reaching about 30% of those living at home and the most common cause of hospitalization. It is estimated that one in three older adult people suffers a fall yearly and less than half report it to their physicians.

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The clinical relevance of falls to an individual is directly correlated with negative outcomes, such as poor health and quality of life (QoL) among older adults (Close et al., 2005). Besides the fall itself, an important aspect to be emphasized in the older adult population is the risk of falling, which has been described as a permanent fear or worry of tumbling. This fear can set up barriers in daily activities and cause a state of anxiety and even inhibition and/or restriction of activities. This can reduce mobility and physical fitness, compromise lower limb muscles and the balance of the older adult, and consequently increase risk of future falls. This way, the risk of falling may be a predictor of falls and, consequently, of their negative repercussions for the older adult, including demands for individualized care.

The "risk of falling" problem has been a major concern not only for the older adult, but also for families and health care providers and can lead to greater use of health services. The consequences of the risk of falling go through the clinical, psychological, social and epidemiological spheres and should receive special attention, since the ramifications of the consequences are important for the health, well-being and quality of life of the older adults. It is important for elderly people to be able to perform their daily activities, maintain functions, and retain their independence and autonomy. The association between falls and quality of life relate to factors such as wellness, self-esteem, functionality, culture, ethics, religion, home environment, and health as key in determining quality of life (Chang et al., 2010).

Falls among older persons are expected to increase along with the proportion of older adults in developing countries like India (WHO, 2008; Jagnoor et al., 2013). According to Registrar General of India, 2011, 8 per cent of the population is 60 years and above. Studies to understand the risk of falling among the elderly are very few. Hence, this study was undertaken with the aim to know the effects of age, gender and socio-economic status on risk of falling among 480 elderly residing in rural and urban Northern Karnataka and Upper Assam and to know its association with Quality of life.

MATERIALS AND METHODS

A differential research design was employed to understand the effect of age, gender and socio-economic status on risk of falling among 480 elderly residing in rural and urban areas of Dharwad and Gadag taluk of Northern Karnataka and Dibrugarh and Sibsagar taluk of Upper Assam, in the age group of young old (60-74 years) and older elderly (75-110 years). Two taluks were selected each from Northern Karnataka and Upper Assam. From each selected taluk two villages and two localities of the city were selected. From each village and locality of city, a sample of 30 elderly was selected. In northern Karnataka, 189 elderly were in the age group of young old category and 51 elderly were in the older group, whereas in upper Assam, 182 elderly were in young old category, 58 elderly were in older group. Elderly who were diseased and bed ridden were excluded from the study. Face to face interviews were conducted using the standard tools.

Tools and measures were: WHO's Global Physical Activity Questionnaire with sub-scale "Risk of falling" surveillance in countries, which comprises of 12 questions. Elderly responses for each statement is Yes/No with two and one score respectively with a range of 0-24 and categorized as follows: Low with 0-8, medium with 9-16 and high with 17-24.

Older People's Quality of life Questionnaire developed by Bowling (2009), is a new 35-item QoL measure. It is a 5-point Likert scale with scores ranging from 0-4 anchored for Strongly Agree to Strongly Disagree, with 8 dimensions: life overall (4 items), health (4 items), social relationships and participation (15 items), independence, control over life, freedom (5 items), area: home and neighborhood (4 items), psychological and emotional well-being (4 items), financial circumstances (4 items), and religion/culture (2 items). Items were scored

(with reverse coding of positive responses, with higher scores indicating higher QoL. The scores ranged from 35 to 175 with 0-58 as low levels, 59-106 as medium levels and >107 as high levels.

Socio Economic Scale developed by Aggarwal et al. (2005) was used. This scale consists of 22 statements which assess education, occupation, monthly per capita income from all sources, family possessions, Number of children, Number of earning members in family, education of children, domestic servants in home, possession of agricultural land and non-agricultural land along with animals and social status of the family with scores ranging from ≤46 to 76 and categorized as low with ≤ 46, medium with 47-61 and high with 62-76.

RESULTS AND DISCUSSION

The risk of falling elderly is compared by gender, age, socio-economic status and quality of life are presented in tables 1a to 4b.

Comparison by Age: It is clear from the Table 1a, that in rural area of Northern Karnataka, 53.3 per cent of young old were at high risk of falling followed by 46.7 per cent with medium risk, whereas, older group were in equal distribution in medium and high risk of falling. However, the association between age and risk of falling was non-significant. Among young old urban elderly, 75 per cent of them were at medium risk and 25 per cent in high risk of falling. In older group 65 per cent were high risk followed by 35 per cent in medium risk of falling. The association between age and risk of falling was highly significant (table b).

Table 1a: Association between Age and Risk of falling of elderly among rural and urban Northern Karnataka and Upper Assam (N=480)

Locality	Age	Risk of falling		Total	χ^2
		Medium	High		
Northern Karnataka					
Rural	Young old (60-74)	42 (46.7)	48 (53.3)	90 (100)	0.10^{NS}
	Older elderly (≥75)	15 (50.0)	15 (50.0)	30 (100)	
Urban	Young old (60-74)	75 (75.0)	25 (25.0)	100 (100)	12.33**
	Older elderly (≥75)	7 (35.0)	13 (65.0)	20 (100)	
Upper Assam					
Rural	Young old (60-74)	76 (80.0)	19 (20.0)	95 (100)	8.09**
	Older elderly (≥75)	13 (52.0)	12 (48.0)	25 (100)	
Urban	Young old (60-74)	82 (94.3)	5 (5.7)	87 (100)	62.54***
	Older elderly (≥75)	8 (24.2)	25 (75.8)	33 (100)	

Figures in parentheses indicate percentages, *Significant at 5 per cent level of probability, ** Significant at 1 per cent level of probability, *** Significant at 0.001 per cent level of probability, NS=Non-significant

In rural Upper Assam, young old had medium levels (80.0%) as against older elderly who were 48 per cent in high levels as against only 20 per cent young old. The association was highly significant. In urban area, 94.3 per cent of the young old showed medium levels and majority of older elderly were with high risk of falling (75.8%). The association was highly significant association indicating that older group had higher risk of falling compared to young old. The mean scores differed significantly only in case of urban group of both the region (table 1b). Dhargave and Sendhikumar (2016) findings are in line with this study which indicated that history of falls, poorer vision, older adults, use of multiple medications, chronic diseases, use of walking aids, vertigo and balance problems were associated with risk of falling among the older elderly population.

Table 1b: Comparison between Age and Risk of falling of elderly of rural and urban Northern Karnataka and Upper Assam (N=480)

Locality	Age	Mean ± SD	t- test
Northern Karnataka			
Rural	Young old (60-74)	17.00 ± 2.29	0.63^{NS}
	Older elderly (≥75)	17.40 ± 2.65	
Urban	Young old (60-74)	15.63 ± 1.78	6.21*
	Older elderly (≥75)	16.75 ± 2.07	
Upper Assam			
Rural	Young old (60-74)	15.03 ± 1.99	3.08^{NS}
	Older elderly (≥75)	15.84 ± 2.25	
Urban	Young old (60-74)	15.32 ± 0.58	131.83***
	Older elderly (≥75)	17.76 ± 1.75	

*Significant at 5 per cent level of probability, *** Significant at 0.001 per cent level of probability, NS=Non-significant

Comparison by Gender: Table 2a depicts that, in rural Northern Karnataka, more than half of the male elderly were in high risk of falling while 40 per cent had medium risk of falling, whereas 55 per cent of female elderly had medium risk and 45 per cent were at high risk of falling. Among urban elderly, 64.2 per cent of male had medium risk while 35.8 per cent were at high risk of falling. But in female, 71.6 per cent had medium risk and 28.4 per cent were at high risk of falling. However, the association between gender and risk of falling was non-significant.

In case of Upper Assam, maximum number of rural male elderly had medium risk (70.2%) and 29.8 per cent were with high risk of falling, whereas 77.8 per cent of female elderly had medium risk and 22.2 per cent had high risk of falling. Among urban elderly, 80.7 per cent of male had medium risk while 19.3 per cent had high risk of falling whereas, among female elderly 69.8 per cent had medium risk and 30.2 per cent had high risk of falling. But no significant association was found. The difference between gender on mean scores were very less with 1 or 2 scores in both the regions (table 2b). But, Dhargave and Sendhikumar (2016) found that women were more likely to fall than men. In men, increased likelihood of falls was associated with high levels of depressive symptoms, older age (75 years and above) and being unable to take the balance test, while in women likelihood of falls was associated with urinary incontinence and frailty.

Table 2a: Association between Gender and Risk of falling of elderly of rural and urban Northern Karnataka and Upper Assam (N=480)

Locality	Gender	Risk of falling		Total	χ^2
		Medium	High		
Northern Karnataka					
Rural	Male	24 (40.0)	36 (60.0)	60 (100)	2.71^{NS}
	Female	33 (55.0)	27 (45.0)	60 (100)	
Urban	Male	34 (64.2)	19 (35.8)	53 (100)	0.77^{NS}
	Female	48 (71.6)	19 (28.4)	67 (100)	
Upper Assam					
Rural	Male	40 (70.2)	17 (29.8)	57 (100)	0.90^{NS}
	Female	49 (77.8)	14 (22.2)	63 (100)	
Urban	Male	46 (80.7)	11 (19.3)	57 (100)	1.88^{NS}
	Female	44 (69.8)	19 (30.2)	63 (100)	

Figures in parentheses indicate percentages, NS=Non-significant

Table 2b: Comparison between Gender and Risk of falling of elderly of rural and urban Northern Karnataka and Upper Assam (N=480)

Locality	Gender	Mean ± SD	t-test
Northern Karnataka			
Rural	Male	17.35 ± 2.15	1.32^{NS}
	Female	16.85 ± 2.58	
Urban	Male	16.04 ± 1.84	1.33^{NS}
	Female	15.64 ± 1.89	
Upper Assam			
Rural	Male	2.29 ± 0.46	0.89^{NS}
	Female	2.22 ± 0.42	
Urban	Male	2.19 ± 0.39	1.88^{NS}
	Female	2.30 ± 0.46	

NS=Non-significant

Comparison by Socio-economic status: Almost equal distribution was noticed among Northern Karnataka elderly with low socio-economic status with levels of risk of falling where as 58.3 per cent of elderly with middle socio-economic status had high risk and 41.7 per cent at low risk of falling (table 3a). Among urban elderly, four of the participants from low socio-economic had medium risk of falling whereas more than half of the elderly percentage (73.0%) from middle socio-economic status had medium risk and 27 per cent had high risk of falling. Higher percentage (60.4%) of elderly from high socio-economic status had medium risk and 39.6 per cent were in high risk of falling.

In rural Upper Assam, higher percentage (83.3%) of elderly from low socio-economic status had medium risk and 16.7 per cent were in high risk of falling, whereas 70.9 per cent elderly with middle socio-economic status had medium risk and 29.1 per cent were in high risk of falling. Elderly from low socio-economic status were very few (only 4), three had medium risk of falling and one had high risk of falling. Among urban area, elderly from middle socio-economic status were in medium risk (78.8%) whereas 21.1 had high risk of falling. 72.1 per cent from high socio-economic status had medium risk and 27.9 per cent were in high risk of falling. The association between socio-economic status and risk of falling was not significant. The differences between socio-economic status on mean scores were very less with 3 to 4 scores were in elderly with low socio-economic status had lesser scores which was similar in both the regions (table 3b). Fear of falling was significantly correlated with associated health problems, history of falls in past 6 months, worried of fall again among fallers, fearfulness of fall again among fallers, restriction of daily and depression among them as reported by Mane et al. (2014).

Table 3a: Association between socio-economic status and Risk of falling of elderly of rural and urban Northern Karnataka and Upper Assam (N=480)

Locality	SES Levels	Risk of falling		Total	Modified χ^2
		Medium	High		
Northern Karnataka					
Rural	Low	42 (50.0)	42 (50.0)	84 (100)	0.70^{NS}
	Middle	15 (41.7)	21 (58.3)	36 (100)	
Urban	Middle	46 (73.0)	17 (27.0)	63 (100)	4.04^{NS}
	High	32 (60.4)	21 (39.6)	53 (100)	
Upper Assam					
Rural	Low	25 (83.3)	5 (16.7)	30 (100)	1.78^{NS}
	Middle	61 (70.9)	25 (29.1)	86 (100)	
Urban	Middle	41 (78.8)	11 (21.2)	52 (100)	0.72^{NS}
	High	49 (72.1)	19 (27.9)	68 (100)	

Figures in parentheses indicate percentages, NS=Non-significant

Table 3b: Comparison between socio-economic status and Risk of falling of elderly of rural and urban Northern Karnataka and Upper Assam (N=480)

Locality	SES Levels	Mean ± SD	t-test
Northern Karnataka			
Rural	Low	17.12 ± 2.39	0.02^{NS}
	Middle	17.05 ± 2.38	
Urban	Middle	15.69 ± 1.99	0.73^{NS}
	High	15.98 ± 1.72	
Upper Assam			
Rural	Low	14.97 ± 1.87	0.51^{NS}
	Middle	15.28 ± 2.13	
Urban	Middle	15.84 ± 1.31	0.85^{NS}
	High	16.10 ± 1.63	

NS=Non-significant

Relation with Quality of life: In rural Northern Karnataka (table 4a), higher percentage (59.6%) of elderly with medium risk of falling had medium level were in 21.1 per cent had high level and 19.3 per cent were in low level of quality of life. Elderly with high risk of falling had medium level (49.2%), whereas, 39.7 per cent were in low level and 11.1 per cent had high level in quality of life. Significant association was observed. Among urban elderly with medium risk of falling, 48.8 per cent had medium levels of quality of life, whereas, 43.9 per cent with high levels and 7.3 per cent had low levels. Elderly with high risk of falling, 47.4 per cent were in medium levels, whereas 39.5 per cent had high levels and 13.2 per cent were in low levels of quality of life.

In case of Upper Assam rural elderly, 44.9 per cent with medium risk had medium levels of quality of life whereas 33. 7 per cent of had high level and 21.3 per cent were in low levels. 45.2 per cent of elderly with high risk of falling had medium levels with 29.0 per cent were at low levels and 25.8 per cent had high levels. Among urban elderly, majority of them with medium risk of falling had high levels (74.4%) and 25.6 per cent had medium levels. Higher percentage (80.0%) of elderly with high risk had high levels and 20 per cent of them were in medium levels of quality of life.

The mean scores differed significantly in case of elderly with medium and high risk of falling by levels of quality of life in rural area of Northern Karnataka (table 4b). Mishra et al., (2017) findings is in line with this study which showed that elderly who had high risk of fear of falling may suffered from depression, due to which they were more prone for low quality of life. (It also indicates significant association between age, fear of falling, depression and quality of life). *Ozcon* et al., (2005) found that quality of life was not correlated with age but age affects the risk factors for falls.

Table 4a: Association between Risk of Falling and Quality of life of Northern Karnataka and Upper Assam elderly (N=480)

Locality	Risk of falling Levels	Quality of life			Total	Modified χ^2
		Low	Medium	High		
Northern Karnataka						
Rural	Medium	11 (19.3)	34 (59.6)	12 (21.1)	57 (100)	6.62*
	High	25 (39.7)	31 (49.2)	7 (11.1)	63 (100)	
Urban	Medium	6 (7.3)	40 (48.8)	36 (43.9)	82 (100)	1.53^{NS}
	High	5 (13.2)	15 (39.5)	18 (47.4)	38 (100)	
Upper Assam						
Rural	Medium	19 (21.3)	40 (44.9)	30 (33.7)	89 (100)	1.03^{NS}
	High	9 (29.0)	14 (45.2)	8 (25.8)	31 (100)	
Urban	Medium	-	23 (25.6)	67 (74.4)	90 (100)	0.37^{NS}
	High	-	6 (20.0)	24 (80.0)	30 (100)	

Figures in parentheses indicate percentages, NS=Non-significant, *Significant at 5 per cent level of probability

Table 4b: Comparison between Risk of Falling and Quality of life of Northern Karnataka and Upper Assam elderly (N=480)

Locality	Risk of falling Levels	Mean ± SD	F-value
Northern Karnataka			
Rural	Medium	81.98 ± 27.12	9.35**
	High	68.13 ± 22.46	
Urban	Medium	99.65 ± 20.62	0.49^{NS}
	High	96.68 ± 23.60	
Upper Assam			
Rural	Medium	90.75 ± 24.54	0.93^{NS}
	High	85.67 ± 27.11	
Urban	Medium	117.81 ± 27.64	0.03^{NS}
	High	116.83 ± 23.12	

Figures in parentheses indicate percentages, ** Significant at 1 per cent level of probability, NS=Non-significant

CONCLUSION

Falls are a common barrier to independent living for many elderly persons. This study showed that older elderly had higher risk of falling compared to young old in urban Northern Karnataka and rural Upper Assam. Rural Northern Karnataka elderly with high risk of falling had low quality of life. Risk of falling appears to contribute to reduced activity independent of other risk factors. Fall prevention programs are indicated for elderly at risk for falls or reporting a fear of falling. These programs can include education about falls and risk-taking behaviors, environmental assessments, assertiveness training, and physical conditioning exercises under supervision should be practiced for strengthening upper and lower limb muscles and developing balance. Group and individual educational activities should be involved as they aim to understand the risks of fall and provide the idea that the fear of falling is controllable.

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