

## EDITORIAL

### The Problems of Fall, Risk Factors and their Management among Geriatric Population in India

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#### Abstract

Falls, road accidents and burns are responsible for the highest rates of mortality among Geriatric Population, particularly in the age group 85 or over. In 2006, with approximately 76.6 million (above 7.7% of total population) India alone accounted for one-seventh of world's elderly. Their population has been steadily growing. It is estimated that India will soon become home to the second largest number of older people in the world. The challenges are unique, a majority (80%) of them are in the rural areas, making service delivery a challenge, feminization of the elderly population (51% of the elderly population would be women by 2016), increase in the number of the older-old (persons above 80 years) and 30% of the elderly are below poverty line.

**Key Words:** Accidents, Elderly, Fall, and Road Traffic Accidents.

#### Introduction:

The global population of people aged 60 years and older would more than double, from 542 million in 1995 to about 1.2 billion in 2025. According to the report of the Union health ministry, the number of people in the 60-plus age group in India will increase to 100 million in 2013, and 198 million in 2030. The elderly population will increase to 12% of the total population by 2025, 10% of whom would be bedridden, requiring utmost care<sup>1</sup>.

India is in a phase of demographic transition. The geriatric population has been steadily growing. It is projected to rise to about 12.4 % in 2026, doubling from 76.6 million in 2006 to 173.1 million in 2026<sup>2</sup>. The major area of concern is their health with multiple medical and psychological problems. Falls are one of the major problems in the elderly and are considered one of the "Geriatric Giants" (immobility, instability, incontinence and impaired intellect/memory)<sup>2</sup>.

#### Definitions of Fall:

In most of the studies cited 'elderly people' are defined as those aged 60 or over and falls are the accidents with the highest mortality rates. The falls' discussed include slips and trips occurring both inside and outside

the home. Definitions given in the literature range from 'events that cause subjects to fall to the ground against their will'<sup>3</sup> to 'falling all the way down to the floor or ground, or falling and hitting an object like a chair or stair'<sup>4</sup> to 'an event which results in a person coming to rest inadvertently on the ground or other lower level, and other than as a consequence of the following: sustaining a violent blow, loss of consciousness, sudden onset of paralysis (as in a stroke), an epileptic seizure'<sup>5</sup>. Most authors simply do not state how they defined falls in their studies so it is not possible to provide a single definition.

Fall can be simplified as an involuntary change in position not due to an overwhelming process like trauma, syncope or seizure. Recurrent fall is defined as 2 or more falls in 6 month period.

#### Epidemiology:

For people aged over 75, falls is the leading cause of accidental death. Among younger elderly people (aged 65-74) it is the second highest cause of accidental deaths and death following traffic accidents. Death rates from falls increase with age, for both men and women. In the age group 65-74, men have higher death rates than women but, after the age of 75, women are more likely than men to die as a result of a fall<sup>6</sup>.

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A significant proportion of falls are thought to be under-reported by older people simply because they are accepted as a 'normal' accompaniment to old age. Studies have shown that elderly women are more likely than men to sustain fall-related fractures<sup>7,8,9</sup>. This is partly due to a higher prevalence of osteoporosis among older women. It has been observed that hip fractures in elderly people are almost always the result of falls.

A survey on fall in India revealed that falls are the second leading cause of unintentional injury mortality and they account for 11% of unintentional injury death worldwide. According to the world health organization (WHO), about 4240000 falls related deaths occurred globally in 2004 and about one fifth of them took place in India<sup>8</sup>.

#### **Etiology / Risk factors:**

Several risk factors for falls in the elderly have been identified from previous studies, including muscle weakness, impaired balancing ability, impaired walking ability, impaired daily movements, and impaired postural control in the presence of external disturbances. However, few studies deal with the relationships between fall risk and other relevant factors<sup>9</sup>.

Falls are multi-factorial. One half to two thirds of falls occur in or around the patient's home.

- 1. Intrinsic Factors:** Age-related changes can impair systems involved in maintaining balance and stability (e.g. while standing, walking, or sitting). Visual acuity, contrast sensitivity, depth perception, and dark adaptation decline. Impairment of the ability to maintain or recover balance in response to perturbations (e.g. stepping onto an uneven surface) occurs in old age. Different disorders and drugs (Psychoactive drugs) are major risk factors for falls. It is generally agreed that depression and anxiety are associated with falls. The mean BMI was low in patients who sustained fractures. Fractures occurred in 48% of sedentary group as against 12% of exercising group
- 2. Extrinsic Factors:** Environmental factors can increase the risk of falls independently or, more importantly, by interacting with intrinsic factors. Risk is highest when the environment requires greater postural control and mobility (eg, when walking on a slippery surface) and when the environment is unfamiliar (eg, when relocated to a new home).

- 3. Situational factors:** Certain activities or decisions may increase the risk of falls and fall-related injuries. Examples are walking with high heels, rushing to the bathroom (especially at night when not fully awake or when lighting may be inadequate), and rushing to answer the telephone.

#### **Complications:**

Falling, particularly falling repeatedly, increases risk of injury, hospitalization, and death. Long-term complications can include decreased physical function, fear of falling & institutionalization. Over 50% of falls among elderly people result in an injury and most are minor. About 5% fall-related injuries account for hospitalizations and about 5% of falls result in fractures. Other serious injuries (e.g. head and internal injuries, lacerations) occur in about 10% of falls. Some fall-related injuries are fatal. About 5% of elderly people with hip fractures die while hospitalized; overall mortality in the 12 month after a hip fracture ranges from 18 to 33%<sup>10</sup>.

#### **Diagnosis:**

Immediately after a fall the evaluation should be done, (a) for assessing injuries due to fall and (b) for assessment of risk of falling. After initial assessment and management of injuries, once the patient is stabilized, he should be evaluated for the cause of fall by taking a relevant history, doing pertinent physical examination and asking for relevant investigations, to prevent further falls.

#### **I. History Taking:**

##### **1. Circumstances of Fall:**

- 1) Location, time of fall. Activities
- 2) Relationship to changes in posture, turning of head, cough, urination
- 3) Accident-trip. Slip

##### **2. Medications**

##### **3. Loss of Consciousness**

- a) Duration
- b) Eye witness account of events during unconsciousness

##### **4. Premonitory or Associated Symptoms**

- a) Dizziness – vertigo, faintness
- b) Palpitations, chest pain, dyspnea
- c) Aura, incontinence of urine/stool, tongue bite
- d) Sudden focal neurological deficit- TIAs/stroke

**II. Physical Examinations:**

Key points in physical examination-

**1. Vital Signs.**

- Respiratory rate
- Pulse rate and rhythm
- Supine and standing B.P
- Fever and Hypothermia

**2. Neurological Examination**

- Vision and hearing
- Higher function
- Neck movements - do they precipitate dizziness
- Focal neurological deficit
- Balance. gait
- Proximal muscle power/tone
- Peripheral nerves (position/vibration)
- Cerebellar function
- Resting tremors. bradykinesia (parkinsonism)

**3. Musculoskeletal**

- Knee joint stability
- Foot deformities
- Fractures

**4. Cardiovascular**

- Carotid bruits
- Carotid sinus sensitivity
- Aortic stenosis

**Get Up and Go Test:**

It is a simple test of gait and balance:

- Patient is seated in a straight backed high seat chair with arm rests located 3 mts away from wall.
- Patient is asked to rise, stand still momentarily, and walk toward the wall. Turn around without touching the wall, walk back to chair, turn around and sit down.
- Test is scored on a 5 point scale from 1 = normal to 5 = severely abnormal.
- Standing on one feet turning 360° and balance after gentle push/tap on sternum are other tests.

**Laboratory Testing:**

There is no standard diagnostic evaluation. Testing should be based on the history and examination and helps rule out various causes: a CBC for anemia, plasma glucose measurement for hypoglycemia or hyperglycemia, and electrolyte measurement for dehydration. Tests (ECG, ambulatory cardiac monitoring, and echocardiography) are only recommended, when a cardiac cause is suspected. Spinal x-rays and cranial CT or MRI are indicated only

when the history and physical examination detect new neurological abnormalities.

**Management:**

In a patient with fall, broad guidelines for management are as follows:

- 1) Treat underlying condition.
- 2) Chalk out an exercise programme for physical conditioning with help of a physiotherapist
  - (a) Gait retraining
  - (b) Muscle strengthening.
- 3) Environmental modification-to remove hazards. Ensure safe pathways and proper light.
- 4) Assistive devices-proper shoes and foot care.
- 5) Reduce the psychotropic drugs.
- 6) Regular eye checkup.
- 7) Good nutrition with restricted alcohol. Nutritional supplements (of vitamin D3 and calcium) can prevent fractures even among very elderly women [11].
- 8) To organize an emergency call system in case of fall.

**Treatment of Underlying Causes of Falls:****A – Neurological:**

|    |                      |   |
|----|----------------------|---|
| 1. | TIAs                 | Aspirin/Surgery if indicated              |
| 2. | Cervical             | Cervical collar, Surgery<br>Physiotherapy |
| 3. | Parkinson' s disease | L-Dopa, Dopa agonist                      |
| 4. | Seizures             | Anticonvulsants                           |
| 5. | NPH                  | Surgery (shunt)                           |
| 6. | Dementia             | Drugs /Supervised activities              |
| 7. | BPPV                 | Vestibular rehabilitation                 |

**B – Gait & Foot Disorder:**

- Physical therapy assistive devices
- Podiatric evaluation and treatment

**C – Drugs:**

- Eliminate the drugs or reduce the dose

**D – Cardiovascular:**

|    |   |  |
|----|---|--|
| 1. | Postural hypotension with venous or autonomic insufficiency | Support, stockings leg elevation, Mineralocorticoid Adaptive behaviors |
| 2. | Drug related  | Elimination of drugs   |
| 3. | Aortic stenosis   | Valve surgery  |
| 4. | Tachyarrhythmias  | Antiarrhythmics  |
| 5. | Bradyarrhythmias  | Pacemaker  |

**Guidelines for Physical Exercises:**

- Emphasis should be put upon exercising at lower intensity for long periods.
- Exercise should begin at a level similar to that already known to be safe for the individual.
- Walking is most generally applicable aerobic exercise.
- Water exercises are best for elderly, allowing movement with low impact on diseased joints & bones.
- Stepwise progression of low impact aerobic and strength training is used for first 4 to 5 months after which maintenance phase is reached. Increase in duration should precede increase in intensity.
- A warm up for 10-15 minutes before aerobic exercise is beneficial.

**Prevention of fall:**

Patients who report a single fall and who do not have problems with balance or gait should be properly informed about reducing risk of falls. Patients who have fallen more than once or who have problems during initial balance and gait testing should be referred to physical therapy or an exercise program. Patients who have fallen repeatedly should be evaluated for osteoporosis. Osteoporosis is an emerging health issue in India resulting in the higher rate of fractures.

Drugs that can increase the risk of falls should be stopped, or given to the lowest effective dose. Environmental hazards should be corrected. Elderly should also be advised on how to reduce risk due to situational factors. For example, use of footwear with flat heels and firm mid soles.

Hip protectors may help protect elderly people who have fallen and are at risk of a hip injury, but many people are reluctant to wear them indefinitely. Having frequent contact with family members or friends, a phone that can be reached from the floor, a remote alarm, or a wearable emergency response system device can decrease the likelihood of lying on the floor for a long time after a fall. Nutritional supplements (of vitamin D3 and calcium) can prevent fractures even among very elderly women<sup>11</sup>.

**Discussion:**

Falls are the accidents with the highest mortality rates, particularly in the age group 85 or over. In 2006, with approximately 76.6 million (above 7.7% of total population) India alone accounted for one-seventh of world's elderly. India, the world's second most populous country, has experienced a dramatic demographic transition in the past 50 years, entailing almost a tripling of the population over the age of 60 years<sup>12</sup>. In recent years, falls in the elderly have been a focus of attention because they adversely affect the lifespan and quality of life (QOL) of the elderly population.

In particular bed rest due to injuries from falls causes a marked reduction in the physical function of the elderly. Falls among the elderly are a major cause of decreased physical function and reduced QOL, and thus preventative measures for falls are considered to be of great importance<sup>12</sup>. For instance; many elderly become bedridden after treatment for femur fracture<sup>13</sup>.

In addition, there is usually a decrease in activity due to the loss of confidence or the fear of falling again, referred to as the post fall syndrome<sup>14</sup>.

While fear of falling is mentioned frequently as an adverse outcome of falling, little is known about it. If individuals at risk of developing fear of falling can be identified and fear of falling proves to be an independent factor in functional decline, it may be possible to target clinical interventions to prevent or alleviate this fear and its consequences in elderly patients<sup>15</sup>. For functional independence, moderate (and high) levels of physical activity appeared effective in conferring a reduced risk of functional limitations or disability<sup>16</sup>. With the high incidence of chronic and multiple diseases suffered by a majority of the aged in India, old age is resulting into a painful experience for many in this country with high risks of ADL impairment and dependencies.

### Recommendations:

As the geriatric population is growing very fast, the major area of concern is the health of the elderly with multiple medical and psychological problems. The rehabilitation needs after falls are considerably high and progressively increasing. Developing countries like India, face the major challenges of prevention, pre-hospital care and rehabilitation in their rapidly changing environments to reduce their burden. There is a need for developing a comprehensive care of providing preventive, curative and rehabilitative services to the elderly. Unlike the developed countries, India does not have well structured health services for the elderly, leading to a relatively ad hoc system of health care delivery to this vulnerable population. Specialized geriatric health services have to be developed, to educate, develop and maintain healthy lifestyles and to provide comprehensive health care. There is a need for extensive education and communication programmes to be undertaken through various media as well as governmental and nongovernmental organizations regarding fall events and preventive measures.

Appropriate government investment is required to develop a screening tool appropriate for public awareness campaigns, in collaboration with academic institutions with expertise in research and development of screening tools. Training of Physicians, Health workers and Care givers in fall prevention programs, urgently needed. It is also necessary to investigate the effectiveness and feasibility of using new and innovative diagnostic and screening devices. These are not only cost effective and innovative but could provide a practical tool for identifying and preventing potential fallers.

An interdisciplinary approach to this high-risk population and Multifaceted programs, including exercise, vision correction, environmental modification and review and adjustment of medication can considerably decrease the risk of further falls and limit functional impairment

At community level, distribution of manuals on physical activity, balanced training and other activities like Yoga, an ancient system of exercises originating in India, can be provided. It is aimed at integrating mind, body and spirit to enhance health and well-being<sup>17</sup>.

### Conclusion:

Falls are one of the major problems in the elderly and are considered one of the "Geriatric Giants". Recurrent falls are an important cause of morbidity and mortality in the elderly and are a marker of poor physical and cognitive status.

Fall associated Injuries are very common in elderly. Current practice generally focuses on the injury, with little systematic assessment of the underlying cause, functional consequences, and possibilities for future prevention.

As the population ages, such problems are expected to grow and pose an even greater challenge to the health care systems. A majority of falls are predictable and therefore potentially preventable.

Community-based falls registries and surveillance systems should be set up to better understand the prevalence, nature, and the trends of unintentional injuries. Several promising strategies such as exercise programmes, environmental modification, and other educational opportunities for preventing falls and fractures exist which can considerably decrease the risk of further falls and limit functional impairment. However, further research is needed to assess the effectiveness of these strategies for the Indian elderly.

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