Understanding Falls and Falls Prevention

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Objectives

At the end of this presentation you will be able to:

1. Understand the scope of the problem
2. Recognize falls as a problem in diverse health care settings
3. Discuss injuries and cost associated with injuries due to falls
4. Value current and emerging falls prevention strategies
Have you experienced a fall?
Fall Facts

• 20-33% community dwelling seniors fall at least once every year

• 27-36% homecare services recipients fall (Fletcher & Hirdes, 2002, Cesari et al., 2002)

• Up to 50% of long-term residents fall each year, many fall multiple times

• Highest rates of falls are 60% among old-old (Speechley et al, 2005) and the oldest old (Fleming et al., 2008; Linattiniemi et al., 2009)

• Falls are leading cause of hospital admissions (CIHI, 2002)

• 32% of in-hospital safety incidents in UK are related to falls (Oliver et al., 2008)

• 90% of in-hospital accidents are falls related (Goodwin & Westbrook, 1993)
Fall Facts (Cont.)

• Falls are the second leading cause of unintentional injury in Canada with 2,225 deaths, 105,565 hospitalizations, and 883,676 non-hospitalizations per year (Economic Burden of Injury in Canada report, SMARTRISK, 2009)

• Residents of LTC have highest incidence of falls and fall-related injury (Rubenstein, 2006)

• Falls account for 40% of all injury-related deaths (WHO, 2007)

• 12-40% people die within a post-fracture year

• Falls cause psychological problems: post fall anxiety syndrome or fear of falling, self-imposed activity restrictions, loss of confidence, diminished self esteem, low self-efficacy, functional decline, depression, helplessness, social isolation, loss of independence ...

• Falls contribute to profound decline in quality of life
Research about falling

In 2011 over 6,000 references (700 reviews) on unintentional falls in older adults

• Theory: Falls are multi-factorial (multiple causes)
• There are many risk factors associated with falls
• Some prevention strategies work (35%)
What causes Falls?

• We don’t know!

• Multifactorial Risk Factor Theory of Falling:

  “Most falls in older adults are the result of the gradual accumulation of both normal age-related and specific disease-related declines in the key systems underlying postural stability “ (Speechley 2011, p. 24)

• We know a lot about RISK FACTORS (400)
  • Intrinsic - person related
  • Extrinsic - environment related
  • Behavioral
Intrinsic Risk Factors

IMMUTABLE

- Advanced age
- Gender (female)
- Ethnicity
- Cognition (dementias)

MANAGABLE

- Chronic illness (incontinence, Parkinsonism, stroke, hypertension, arthritis, peripheral neuropathy...)
- Sensory deficits (vision, vestibular, neuropathy, proprioreception, somatosensory)
- Reduced redundancy of physiological systems

CHANGEABLE

- Acute illness
- Depression
- Muscle weakness (sarcopenia)
- Dizziness (syncope, postural hypotension)
- Foot problems
- Fear of falling (both cause and effect)
- History of falling (risk marker, not a factor)
Behavioral Risk Factors

- Risk taking
- Balance between risks and personal freedoms
- Inattention
- Poor diet
- Diminished physical activity
- Fear of falling
- Alcohol use
Extrinsic Risk Factors

- Architecture
  - Environmental design
  - Obstacles (clutter, pets, cords, carpets)
- Lighting
- Slippery floors
- Footwear
- Uneven pavements, stairs, lack of handrails
- Unmarried/living alone
- Polypharmacy

- Weather (snow, ice, wet leaves)
- Socioeconomic status (access to health, low income, education, housing)
Mechanism of Falling
Causal Pathways

• Balance
  • posture (static)
  • gait (dynamic)
• Perturbation
• Failure to rapidly regain balance
• Only when internal balance mechanisms are compromised, external (environmental) hazards become a problem
• Temporal sequencing

• Balance and Gait are proximal systems through which distal risk factors combine
Consequences of Falls - Injuries

• The consequences range from: no injury; minor, moderate and serious injuries, and death (Hitcho et al., 2004; Krauss et al., 2005)

• 50% fallers experience a minor injury

• Varying rates of serious injuries (fracture, dislocation, laceration requiring suture): 3% (O’Laughlin et al., 1993), 6% (Nevitt et al., 1991), 11% (Tinetti et al., 1988), 10-15% (Australian Commission on Safety and Quality in Health Care, 2009)

• Falls account for 18-49 % of emergency department visits (Ball et al., 2000; Davies & Kenny, 1996)

• 80% of all injury-related admissions to hospital are due to falls (Kannus et al., 2006, Peel et al., 2002)
Consequences of Falls - Injuries

• Hip fracture rates 1,000/year are: community 5.0; group housing 11.3; residential homes with low care 36.1 and nursing homes 17.2 (Brennan et al., 2003)

• Fall related traumatic brain injuries account for 46% of fatal falls among older adults (Stevens et al., 2006)
Consequences of Falls - Cost

• Indirect - societal productivity losses of fallers and family caregivers
• Direct Cost – treatment, rehab, medications
• Relevant economic burden regardless of medical system

• 0.85-1.5% of total health care expenditures in North America (Heinrich et al., 2009); 0.07% - 0.20% of the Gross Domestic Product
• Mean hospitalization cost: USD $5,654 - $42,840 (Heinrich et al., 2009)
• Direct cost high for fractures of females in hospital and LTC
• The most costly type of unintentional injury in Ontario: $1.9 billion (more than motor vehicle collisions!)

• Need to calculate a UNIT of measure for serious injurious falls
Cost of serious injuries due to falls

• Purpose: Estimate the cost of serious injurious falls in a Canadian acute care hospital

• Objectives:
  1. Estimate the total cost and length of stay (LOS) for patients who fell during the hospital stay
  2. Compare costs and LOS of fallers and non-fallers

• Data sources:
  • Risk Management database: number and severity of falls
  • Case Costing database: cost records for index and matched control cases
  • Chart review: Identify services related to falls
Cost of serious injuries due to falls

- Study Period: 2.5 years (April 2005 – October 2007)
- Injury
  1. None 1,184
  2. Minimal 1,418
  3. Moderate 132
  4. Serious 37 TOTAL: 2,771 falls

- Fallers: 37 serious injuries, gender: F=23, M=14; mean age: 74 (range 35-93)
- Matched controls: 2,113 (mean=63/case), matched by age (+/- 5 years), gender and most responsible diagnosis. Adjusted for Charlson’s Comorbidity Index
The average total cost for patients who were seriously injured after a fall during an in-hospital stay was $44,203, which was $30,696 greater than $13,507 for matched controls.
Average Hospital Costs
Average LOS
Falls Prevention Interventions

• Comprehensive falls and injury prevention and management strategy is needed (Tideiksaar, 1998)

• Health Care Organizations
  • Hospitals: patient/resident safety & Risk management and quality improvement
  • Long Term Care (Cameron et al., 2010)

• Community based (Gillespie et al., 2012)
  • Independent living
  • Home care
  • Assistive living
## Interventions in Community (Gillespie et al., 2012)

159 RCT, 79,193 participants; Single interventions & multifactorial programs

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Rate of Falls</th>
<th>Risk of Falling</th>
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</thead>
<tbody>
<tr>
<td>Multiple-component exercise (both group and home based)</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Tai Chi</td>
<td>? (borderline)</td>
<td>✓</td>
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<tr>
<td>Multifactorial interventions with individual risk assessment</td>
<td>✓</td>
<td>❄</td>
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<tr>
<td>Vitamin D</td>
<td>❄</td>
<td>❄</td>
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<tr>
<td>Home safety assessment and modifications</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Vision treatments</td>
<td>❄</td>
<td>❄</td>
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<tr>
<td>Glasses adjustments from multifocal to single lens</td>
<td>✓ (❄)</td>
<td>-</td>
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<tr>
<td>First eye cataract surgery</td>
<td>✓ (1st), ❄ (2nd)</td>
<td>-</td>
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<tr>
<td>Pacemakers</td>
<td>✓</td>
<td>❄</td>
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<tr>
<td>Withdrawal of psychotropic meds</td>
<td>✓</td>
<td>❄</td>
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<tr>
<td>Medications modifications</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>Anti-slip shoe</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>Podiatry with foot and ankle exercises</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>Cognitive behavioural interventions</td>
<td>❄</td>
<td>❄</td>
</tr>
<tr>
<td>Fall prevention education programs</td>
<td>❄</td>
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Interventions in LTC (Cameron et al., 2010)
41 RCT, 25,422 participants

<table>
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<tr>
<th>Intervention</th>
<th>Rate of Falls</th>
<th>Risk of Falling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervised exercise</td>
<td>? (inconsistent)</td>
<td>?</td>
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<tr>
<td>Multifactorial interventions</td>
<td>☐</td>
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<tr>
<td>Multifactorial interventions by multidisciplinary team</td>
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<tr>
<td>Vitamin D</td>
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- Comprehensive, structured, individual assessments with specific safety recommendations
- Multidisciplinary program specific to residents
- Multifaceted intervention – (edu, enviro, balance & resistance, hip protector)
- Calcium and vitamin D supplementation
- Clinical medication review
- Multifactorial intervention (fall risk evaluation, specific and general interventions)
  
  Neyens et al., 2011, (20 RCTs)

- Best assessment tools for LTC: Morse Fall Scale and Mobility Fall Chart (Kehinde, 2009). All LTC residents are high risk and need interventions (Scott et al., 2007)
Best Practice Guidelines

- Registered Nurses’ Association of Ontario
- Prevention of Falls and Fall Injuries in the Older Adult (2005)
- Recommendations include:
  - Morse Fall Scale
  - Reviewing contributing factors (e.g., medications)
  - Call system within reach
  - Bed alarms
  - Bed at appropriate height
  - Commode at bedside
  - Toileting regime
  - Uncluttered environment
  - Walking aids accessible
What can seniors do to prevent falls?

- Keep active
- Adjust to environment and weather
- Modify indoor environment
- Be aware of medication side effects
- Use assistive devices and hip protectors
- Learn from near falls
- TALK ABOUT FALLS!
Future of Healthcare

- Shaping tomorrow.com
- 10+ years translation lag from research into clinical practice
- 90% of research spending is on 10% of the illnesses
- Reactive planning
Future of Healthcare

• Future:
  • Home becomes center of care
  • Smart technology (smaller, less invasive, faster, cheaper, earlier). Smart clothes, bathrooms, kitchens and houses; remote telehealth
  • Hospitals move from treatment into teaching centers (LOS in days)
  • LTC predominantly cares for cognitively impaired residents
  • Staff shortages
  • Medical tourism
Thank you

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Questions?

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