

Evidence & Team Based Interventions to Reduce Risks for Falls

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Overview

- Identify risk factors for falls in community dwelling older adults
- Describe an evidence-based project design & intervention to reduce fall risk: *FIRRRST*
Fall Intervention Risk Reduction Recommendations for Seniors Today
- Demonstrate fall risk screening tools & fall risk reduction activities.
- Identify fall risk reduction activities in your community.



Who falls nationally?

- 1 in 3 adults aged ≥ 65 every year (Stevens et al. 2012).
- Among this age group falls are leading cause of fatal and non fatal injuries.
- In 2013: 2.5 million non fatal falls treated in EDs; 734,000 hospitalized 25,500 deaths.
- Falls are the most common cause of TBI and one-half of older adult falls are due to TBI.
- Fall death rate is approx. 40 % higher for men
- Whites are 2.7 times more likely to die than other races.
- Older non Hispanics have higher rates of falls.



Who falls in Oregon?

- Fall rates have been reported at 70% higher than national average (Purcell, et al., 2008).
- (2013) rate of falls was 91.9 per 100,000.
- Represents an increase of 46% since 2000.
- (2013) 639 falls with 87% in ages ≥ 65
- Older men have higher fatality.
- Rate of fatal falls among ≥ 85 is 21 times $>$ ages 65 -74.
- Over 5,800 hospitalizations.
- Women were twice as likely to be hospitalized.
- Age >85 and older = twice as likely to be hospitalized



What are the costs?

- Physical
 - $>$ 95% of hip fractures are caused by falls, other common fractures in wrist, leg spine, forearm, pelvis, hand, upper arm.
 - 20-30% of sustained injuries can make it hard to live independently and increase the risk of early death.
 - Many develop a *fear of falling* causing limited activity, reduced mobility, loss of physical fitness causing \uparrow risk for more falls and early death.
- Financial
 - *Nationally:* 2.5 million nonfatal (≥ 65) falls treated in ER and 734,000 were hospitalized *direct medical costs of falls \$34 billion.*
 - *Oregon:* Hospital costs \$ 219 million.




Risk Factors and Prevention

- Aging population + \uparrow life expectancy = fatal fall death rates likely to continue.
- Age is a risk factor for falls.
- Aging does not cause falls.
- Risk factors and effective prevention measures are demonstrated in scientific literature.



Evidence-Based Practice

- Clinical expertise (expert opinion) +
- External scientific evidence +
- Client/Patient/Caregiver perspectives to
- Provide high quality services reflecting the interests, values, needs choices of the person served.



Quality Improvement Project Using EBP

- Engage caregivers, older adults, families, health providers in community based care (ALF) setting.
- Promote team approach to fall prevention strategies.
- Review the evidence.
- Design project to include interdisciplinary and educational interventions.
- Collect data, measure the change.
- Recommendations for policy and practice in CBC.



The Iowa Model for EBP Change Application in Oregon ALF

Problem & knowledge triggers
 Identification of problem: Falls in older adults in ALF+ Lack of evidence-based risk screening and risk reduction interventions.

Administrative management directs operations to meet minimum licensing standards for services designed to enhance the dignity, independence, individuality and decision making ability of the resident in a safe and secure environment while addressing the needs of the resident in a manner that supports/enables individuals to maximize their abilities to function at the highest level possible (OARs 1977).

Team consisting of project coordinator (DNP candidate), ED, AD, nurse, direct care workers, Pharmacist and PT.

Review of the research conducted → SUFFICIENT APPLICABLE EVIDENCE LOCATED

Change in practice: Targeted Outcomes

1. Increase knowledge of effective fall prevention activities based on identified risks and risk reduction.
2. Conduct EBP fall screenings and assessments to determine risk factors.
3. Implement EBP interventions to reduce fall risk factors.
4. Design EBP screening and risk reduction protocols.
5. Evaluate increase in knowledge using pre and post tests
6. Compare number of fall risks screenings both pre and post intervention activities.
7. Compare number of falls both pre and post intervention.
8. Modify fall prevention protocols.

Evidence Review

- In depth literature search: 1991-2011 for effective fall risk assessment and intervention strategies for older adults living in community (outside of hospital and nursing homes).
- 2008 CDC Report: Preventing falls: What works: A compendium of effective community based interventions from around the world.



Causes of Falls: (Summary of 12 Studies)

- Accident/ environment 31%
- Gait/balance disorder 17%
- Dizziness/vertigo 13%
- Drop attack 10%
- Confusion 4%
- Postural hypotension 3%
- Vision problem 3%
- Other Specified 15%
- Unknown 5%



Evidence Review

- Significant meta-analysis conducted in 2003 by Rand Corp (RC) for CMMS.
- Rigorous synthesis of 826 studies, 95 met specific criteria including: ≥ 65 , used RCT, falls as an outcome, measured falls at least 3 months after start of intervention to determine fall prevention
- Interventions categorized as exercise, education, environmental modifications or multiple component interventions
- Used data from 38 RC studies, CDC selected 14 studies



Evidence Review

- Fourteen separate randomized clinical studies were recruited by various methods including
- Letters from physicians
- 2 HMOs
- VA ambulatory care
- Post hospital and ER discharge contact
- Residents of self care and intermediate care villages informational sessions
- Visitors to local senior centers
- Study length varied 12-24 months
- 3 Study method categories: home modification, exercise, multifactorial.



Home Modification

- 2 RCT studies: home visits (3 total either by PT,RN or OT) to conduct home safety assessments, identify hazards and unsafe behaviors.
- Frail elderly visited during and after hospitalization.
- Home modifications, instructions in use of safety and mobility aids fall rates were ↓31 %.
- 2 of more falls in previous year, fall rates were ↓37%
- Third study: OT conducted home visit with phone call follow up: Fall rates reduced by 33% but only who had one or more falls in the previous year.



Exercise-based Intervention

- 5 separate RCT and one study combining 2 RCT at multiple sites (Otago, New Zealand)
- All but Otago took place in group or classroom format.
- Otago: for those who did not want to attend or could not reach a group or rec facility.
- Ages ranged from 56-97.
- 4 PT or RN home visits over first 2 months and again at 6 months with monthly telephone calls.
- Exercise sessions varied between studies from 30-90 minutes.
- Overall fall rates ↓35 % AND ≥80 yr olds with falls in previous year = greatest benefit



Exercise-based Interventions

- Tai Chi utilized in 3 of the 6 studies showed the most effective results with overall ↓ fall rates of 35-55%.
- Two studies conducted in local senior center, and one in residential retirement community. Fuzong Li et al. 2005 Oregon Research Institute
- Two of the of the 3 studies used a modified form, using slow movements with stretching, balance and breathing.



Multifaceted Interventions

- Six separate RCT studies included various combinations of approaches were used including:
- Individual risk screenings, balance screenings; environmental hazard assessments; exercise programs emphasis on balance training;
- Medication adjustments; postural hypotension & vision checks; daily Vit D supplements;
- Fall risk education, prevention and how to stay motivated in exercise.



3 HMO studies

- HMO in Oregon and Washington (1994 Hornbook, M. et al.)
 - Included home visits, weekly exercise, health behaviors, educational classes (SAFE) Study of Accidental Falls in the Elderly. Team: PT and life style change expert = ↓15% less likely to fall.
- HMO in Conneticut (1994 Tinetti, et al.)
 - Yale Frailiy and Injuries Cooperative Studies of Intervention Techniques (FICSIT) delivered in participant's homes; tailored to individuals' risk factors aged 70≥ ; med adjustments, behavior change recommendations, education, training and progressive balance exercises = ↓30 % less likely to fall.
- HMO in Seattle (1994 Wagner et al)
 - RN conducted simple screening for 6 risk factors: inadequate exercise, alcohol use, home hazards, use of psychoactive drugs, hearing and vision impairments. Individual interventions and referrals=↓10 %



Multifaceted Interventions

- **Stepping On** (Clemson et al. 2004) from Sydney, Australia.
 - Small group initial sessions in community setting with baseline screenings then home follow up.
 - Balance exercises, Vit D, home environmental hazards, safe footwear, poor vision, medication reviews w/recommendations.
 - Team (OT, RN, PT and city transportation rep) led seven weekly tow hour sessions.
 - Intervention group ↓31 % reduction in falls.
- **PROFET** (Close et al. 1999) from London
 - Team of Geriatrician, PT, OT, RN focused on various medical and therapy assessments: vision, balance, cognition, affect, depression, meds, postural hypotension, environmental hazards, advice, education and home modifications.
 - Most effective study = ↓60 % less likely to fall once and 67% less likely to fall repeatedly (at least 3 times).



Screening for Falls

- **USPSTF recommends yearly screening age ≥75.**
- **Oregon Health Authority: screen age ≥ 65.**
- **Screen for history of falls in last 12 months.**
- **Get up and Go Test:**
 - "Rise from the chair, walk 20 feet, turn, walk back to the chair and sit down."
 - Risk for falls if timed more than 10 seconds to complete the task.
 - VERY high risk for falls if more than 20 seconds to complete the task.



Fall Risk Follow up Assessments

- Environmental assessment & modification (slips, trips)
 - Eyewear, footwear, gait aids
 - Home safety and fear of falls
- Check for orthostatic B/P (postural hypotension): drop B/P = 20/10 points when changing position from laying, sitting, standing within 2-5 minutes.
- Reduction of risky medications (Beers List) and total medications (polypharmacy).



Further Fall Risk Reduction Recommendations

- Vitamin D supplementation = 26% ↓fall risk
- Tai Chi = 49% ↓ fall risk
- Muscle strengthening/ balance retraining = 17% ↓risk
- Withdrawal of psychotropic meds- 66% reduced risk
- Home safety assessment for person with history of falls- 34% reduced risk

Frick, JAGS 58:2010



Vitamin D↑Muscle Strength

- Vitamin D deficiency can result in myopathy
 - Proximal muscle weakness with difficulty climbing stairs, rising from sitting or squatting position, waddling gait, uniform general muscle wasting, and/or bone pain may occur.
 - Symptoms resolve with Vitamin D treatment
- Vitamin D quickly increases muscle strength through its effect on calcium transport and protein synthesis.
 - Vit. D supplementation improves body sway, musculoskeletal function, reaction time, aggregate functional performance and postural sway Ceglia L. Molec. Aspects of Medicine 2008;29:407-414



Vitamin D↓Fractures and Falls

- Numerous studies have documented positive benefit of vitamin D on falls
- Fall reduction can be dramatic and can be observed within months
- Daily vitamin D doses of at least 800 IU are needed to observe benefit



Older Adults (especially women) and Exercise- What are the Barriers?

- Older white women are less active than other cultural groups.
- Older women decide to exercise or not based on the perceived balance of risk and benefit
 - I might wear out my body
 - If I am healthy, I don't need to exercise
 - I am already old- so exercise won't help me
 - I might consider walking- but lifting weights is for men
 - Exercise activities are hopelessly difficult



Tai Chi and Falls Reduction in Older Adults

- 6-month RCT in Oregon of 3x/wk Tai-chi vs. stretching
- 256 inactive, home-living elders (age 72-92)
- 6 month study

	Tai-chi	Stretching	
Falls	38%	73%	p<.01
Fallers	28%	46%	p=.01
Inj. falls	7%	18%	p=.03

Tai-chi group also significantly better in: balance, physical performance & fear of falling
L.F. et al., J Gerontol Med Sci, 2005




Tai Chi Video



Gradual Dose Reduction as a Falls Prevention Strategy


- Antipsychotics
 - First year, two separate quarters/year, then annually
- Sedative/Hypnotics
 - Quarterly (at least)
- Other psychopharmacologic drugs
 - First year, two separate quarters/year, then annually



Gradual Dose Reduction (GDR)


- Prospective 6 month clinical trial in 150 bed SNF
- Selection criteria: Psychotropic meds, disruptive behaviors, pressure ulcers, falls
- Interdisciplinary Team: Nurse, social worker, dietician, consultant pharmacist, therapy and activity staff
- Monthly chart review, twice-weekly team meetings.
- Recommendations transmitted to attending physician

Coggin. JAGS 2010;113:189



Outcomes of GDR

- Psychiatric Discharge to hospital DECREASED 72%
- Pressure ulcers DECREASED 66%
- Hypnotic Rx >2 x/week DECREASED 64%
- Decline in ADLs DECREASED 59%
- Anxiolytic Rx DECREASED 54%
- Antipsychotic Rx DECREASED 54%



Outcomes of GDR

- Depression Dx without treatment DECREASED 47%
- Falls (highest risk) DECREASED 25%
- Falls resulting in hospitalization DECREASED 23%
- Fractures DECREASED 17%
- Increased depression/anxiety DECREASED 10%

Coggins, JAMA 2010;303(13):1899



Practical Tips for GDR

- Primary care physician collaboration
- Supportive family members
- Pharmacist partnership & coordination
- Care staff communication among all of the above
- Schedule GDR in advance but not automatic
- Embrace the potential for positive outcomes




Monitor Closely When Decreasing/Stopping Medications

- When medications are stopped, up to 30% of patients will have an adverse drug withdrawal event
- Narcotics, Benzos, SSRIs, and Clozopin have highest likelihood of withdrawal if stopped too quickly
- Does this mean you should never stop drugs?
- No - because if you don't stop unneeded meds, there is a 50% risk of problems.



Environmental Approaches to Falls Prevention

- Home hazards
- Footwear
- Eyewear
- Fear of falling




Fall and Injury Prevention
RESIDENT APARTMENT ENVIRONMENT CHECK

Date:	Resident Name:	YES	NO
Do all of my lights turn on (burned out bulbs?) and give adequate lighting?			
Do I have night lights to light up a pathway to and from my bed and bathroom?			
Do I have my call button on me?			
Do I have Oxygen tubing on the floor where I can trip on it?			
Are there any types of cords (extension cords, telephone cord) on the floor where I can trip on?			
Do I have any throw rugs/mats on the floor in my apartment or bathroom?			
Do I have a non-slip rubber mat in my shower for when I take showers?			
Do I have grab bars by my toilet and in my shower?			
Is my apartment clutter free (ex. stacks of box's, small walk way to walk through, piles of clothes, papers, books, shoes)?			
Does my bedding or bedspread hang over too long onto the floor where I can trip on it?			
Do I wear properly fitted shoes with non skin soles?			
Do my bed and or chair(s) need height adjustment for me to get in and out of them safely?			



Environmental Hazards

- Uneven and slippery surfaces- bath, kitchen
- Loose carpets and mats
- "The clutter of a lifetime"
- Poor lighting
- Difficult- to-reach items
- Electrical cords



Home Modifications

- Clearly mark the edge of stairs and uneven surfaces
- Secure mats and carpets
- Remove clutter (easier said than done!)
- Arrange furniture in a way that provides assistance, rather than obstacles
- Install night lights
- Place nonslip padding in shower and tub; install grab bars in shower and next to toilet
- Install handrails along staircases



Footwear Style & Fall Risk

- Prospective 2-year study of independent elders, compared 327 fallers to 327 controls
 - Athletic & canvas shoes were safest
 - Other types of shoes increased falls by 70%
 - Going shoeless increased falls 10-fold (1000%)
- Koeppell et al, JAGS 52:1495, 2004



American Geriatrics Society & British Geriatrics Society 2010 Clinical Practice Guidelines for Falls Prevention

- Exercise for balance, gait and strength training, such as Tai Chi
- Supplementation with Vitamin D
- Reduction of risky medications as well as total medications
- Environmental adaptation to reduce fall risk factors in daily activities
- Raising low blood pressure and managing heart rate and rhythm abnormalities



How Can We Reduce Fear of Falling?

- Randomized trial to:
 - promote fall risk and fear of falling as controllable
 - set realistic goals for increasing activity
 - change the home environment
 - promote exercise to increase strength and balance.
- Outcomes:
 - Decreased fear of falling
 - Increased daily activity
 - Improved perceived consequences of falling
- At 14 months, significantly fewer fallers in the intervention group



Zijlstra, Journal of American Geriatrics Society, 2009, 57:2020-2028.

Fall Intervention Risk Reduction Recommendations for Seniors Today

- Summary of Project Intervention
 - Formed a team
 - Reviewed the evidence for fall risk screenings and fall risk reduction activities
 - Collected and analyzed falls data
 - Provided staff training & educational interventions on risk and risk reductions
 - Piloted Screenings and Assessments
 - Provided Tai Chi sessions
 - Pharmacist conducted review, analysis and recommendations for drug eliminations and GDR.



Project Measurements

- Pre-training knowledge scores average 32.9 %
- Post training knowledge scores average 75.28%
- Overall increase of 42.89 % in knowledge
- 75% of ratings at Very Good-Excellent for overall effectiveness of training (5 point rating scale) including *content quality, relevance* and *format*. 25% ranked Good.



Project Measures

- Staff Confidence levels (5 point ranking scale) both before and after educational training were measured.
- Readiness to implement what they had learned including conducting screenings and making recommendations.
- Fall data collection included number of falls, number of individuals who fell.
- Fall data was analyzed for reoccurrences.
- Number of residents attending Tai Chi
- Recommendation for System Changes



Project Limitations

- 10 week Implementation
- Retail pharmacy
- Family educational intervention
- Limited contact with Primary Care Providers (Letter)
- Staff turnover
- Leadership and sustainability



Identify Fall Risk Reduction Activities in Your Community

- Do you screen for falls on move in?
- During 90 day evaluations?
- Do you conduct fall assessments to identify individual risk factors? How often?
- Do you have an interdisciplinary team? (They talk to one another and coordinate care).
- Do you collect falls data? Do you analyze data?
- Do you use data analysis to promote changes to policies and procedures, staff trainings?
- Do you offer Tai Chi?
- Do you have a staff, family and resident educational program?





Questions?

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