THE IMPACT OF FEAR OF FALLING ON FUNCTIONAL INDEPENDENCE

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Mary Angelina Lawson

9-10-1922
10-27-2008

Geneva, N.Y.

Captain
Army Nurse Corp
OBJECTIVES

- Participants will be able to discuss how fear of falling influences an older adult’s functional level.
- Participants will be able to discuss implications of this study for Occupational Therapy Practice.
- Participants will be able to discuss the importance of addressing fear of falling in the MOT academic curriculum for the older adult population.
A Growing Public Health Crisis

- One out of three older adults (≥ 65) falls each year.
- 75% of fatal falls occur in this population.
- 35-40% of non-institutionalized adults fall each year.
- This number increases to 50% for those 75 and older. (CDC, 2013)
RELEVANCE

• 13% of the US population are 65 or older

  ▪ Census Data
    ▪ There was a 15.1% increase in number of older adults from 2000 to 2010.
    ▪ By 2050, population of 65 and older is expected to double to 71 million.
    ▪ In the United States each year, one in every three adults age 65 and older suffers a fall, of which up to 46% die due to complications (CDC, 2013)
EXTRINSIC RISK FACTORS

Environmental conditions

Home safety

Hospital discharge

Hx. of falls

Clothing and footwear

Assistive devices

Walking aids
INTRINSIC RISK FACTORS

Cognitive

Muscle weakness

Visual

Balance and gait

Impairments

ADL’s

Medications

Age

Disease

Living alone

Nutrition

Gender

Muscle weakness

Psychological
CONSEQUENCES OF FALLS

• Loss of Life
• Physical Disability
• Emotional / Psychological Impact
• Financial
ECONOMIC IMPACT OF FALLS

Falls among older adults account for 1.5 – 2 million ER visits per year

350,000 – 400,000 of those visits result in hospitalization

Fall related injury is one of the 20 most expensive medical conditions for non-institutionalized older adults

According to Medicare, cost per fall ranges from $9,113-$13,507

By 2020, the annual cost of fall injuries is projected to be $54.9 billion (Englander, Hodson, & Terregrossa, 1996).
FALLS EFFECT ON WELL-BEING

Health
Physical
Psychological
FEAR OF FALLING

An increased pre-occupation with anticipated falls when engaged in activities of daily living and social participation

(Zijlstra, Haastregt, Rossum, et al. 2003)
FEAR OF FALLING

• 1/3 to 1/2 of older adults acknowledge fear of falls

• **Fear of falling is associated with:**
  • depression
  • decreased mobility and
  • decreased social activity
  • increased frailty
  • increased risk for falls as a result of deconditioning
Decreased physical activity has a positive correlation to increased falls (Zijlstra, Haastregt, Rossum, et al. 2003).

Decreased level of confidence leads to restricted social and activity participation.

Up to 50% of people who fear falling restrict or eliminate social and physical activities because of that fear (Tinetti, Speechley & Ginter, 1998).
The association between fear of falling and functional independence

- Decrease in activity level
- Increased debility
- Loss of independence with ADL

Researchers have hypothesized that this chain of events is what increases the risk of further falls

(Arfken, Lach, Birge, et al., 1994)
META-ANALYSIS
RISK OF FALLS AND ADL FUNCTION

The odds ratio of increased falls associated with disturbances in performance of ADL was 2.28 (95% C.I. = 2.10 – 2.48)

Reduced capability of performing ADL is associated with increased risk of falls.

(Bloch, Thibaud, Dugue et. al., 2010)
WHO HAS FEAR OF FALLING?

- Fallers - a recent fall is a known cause for developing a *fear of falling*

- Non-Fallers - *Fear of falling* is also prevalent among non-fallers.

WHAT IS THE ISSUE?

• Self-reported measures versus objective assessment

• High-risk Community Dwelling Older Adults
  • Receiving home health services
  • History of falls
RESEARCH QUESTION 1

This study was designed to investigate the relationship between:

- Fall history,
- ADL capability,
- Balance/functional mobility, and
- Fear of falling
RESEARCH QUESTION 2

Is there a relationship between objective measures of

- Balance and functional mobility,
- Performance of activities of daily living,
- Fear of falling
**MEASURES**

- **KATZ ADL-staircase - Observed performance:**
  
  \[
  P-\text{ADL} = \text{(bathing, grooming, toileting, transfers, feeding, and dressing)}
  \]
  
  \[
  I-\text{ADL} = \text{(cooking, laundry, light house cleaning)} \quad (\text{Iwarsson, 1998})
  \]

- **Falls Efficacy Scale - Self-reported confidence with performing ADL without falling** 
  
  (Tinetti, Richman & Powell, 1990)

- **Fear of Falling - Self-reported perceived susceptibility and perceived severity of falling.**

- **Modified Timed Up and Go - Test of functional balance/mobility under three conditions** 
  
  (Kratz, Schepens & Murphy, 2013)
PROCEDURES

- Two hour home visit:
  - Self-Report Measures:
    - FES Measurement
    - Fear of Falling
  - Objective Measures:
    - KATZ ADL-staircase
    - Modified Timed Up and Go
  - Summarized findings of assessment and reviewed Risk Reduction Brochures.
### Participant Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean (SD)</th>
<th>National Average</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Medications, Mean (SD)</td>
<td>8.3 (4.7)</td>
<td>2.9</td>
<td><a href="www.pharmacist.com">www.pharmacist.com</a>, 2014</td>
</tr>
<tr>
<td>Number of Diagnoses, Mean (SD)</td>
<td>5.0 (2.3)</td>
<td>2 to 3</td>
<td>Kaplan, 1999</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reason for Referral, n (%)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Post-op Recovery</td>
<td>26 (26.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall episode</td>
<td>7 (7.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute health episode</td>
<td>66 (66.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Falls reported in past 3 months, Mean (SD)</td>
<td>2.8 (1.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Count (Percentage)</td>
<td></td>
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<td>--------------------------</td>
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<td></td>
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<tr>
<td><strong>Age, mean (SD)</strong></td>
<td>78.6 (7.9)</td>
<td></td>
<td></td>
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<tr>
<td><strong>Gender, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>33 (33.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>66 (66.7)</td>
<td></td>
<td></td>
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<tr>
<td><strong>Ethnicity, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>65 (65.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>23 (23.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>11 (11.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insurance, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicare</td>
<td>71 (71.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uninsured</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicaid</td>
<td>28 (28.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score</td>
<td>Criteria</td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>-------</td>
<td>----------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>1</td>
<td>Independent with all ADL</td>
<td>26</td>
<td>26.3%</td>
</tr>
<tr>
<td>2</td>
<td>Independent with all except One ADL</td>
<td>4</td>
<td>4.0%</td>
</tr>
<tr>
<td>3</td>
<td>Independent with all except Bathing plus one ADL</td>
<td>11</td>
<td>11.1%</td>
</tr>
<tr>
<td>4</td>
<td>Independent with all except Bathing, Dressing plus one ADL</td>
<td>15</td>
<td>15.2%</td>
</tr>
<tr>
<td>5</td>
<td>Independent with all except Bathing, Dressing, Toileting plus one ADL</td>
<td>9</td>
<td>9.1%</td>
</tr>
<tr>
<td>6</td>
<td>Independent with all except Bathing, Dressing, Toileting, Transfers, plus one ADL</td>
<td>31</td>
<td>31.3%</td>
</tr>
<tr>
<td>7</td>
<td>Dependent with All ADL</td>
<td>3</td>
<td>3.0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>99</td>
<td>100%</td>
</tr>
</tbody>
</table>
**X² Analysis: N=99; df = 1; α = .001**

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Mean (SD)</th>
<th>Not Impaired</th>
<th>Impaired</th>
<th>X² Observed</th>
<th>X² Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUG Alone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 to 28 seconds</td>
<td>12.32 (6.29)</td>
<td>N = 60</td>
<td>N = 39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TUG Manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 to 35 seconds</td>
<td>15.98 (7.32)</td>
<td>N = 49</td>
<td>N = 50</td>
<td>10.83</td>
<td>5.12</td>
</tr>
<tr>
<td>TUG Cognitive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 to 47 seconds</td>
<td>20.70 (8.73)</td>
<td>N = 25</td>
<td>N = 74</td>
<td>51.83</td>
<td>10.83</td>
</tr>
</tbody>
</table>
Correlation between TUG and KATZ ADL-staircase

<table>
<thead>
<tr>
<th></th>
<th>TUG alone</th>
<th>TUG manual</th>
<th>TUG cognitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>KATZ</td>
<td>$r = 0.31$ ($p = 0.001$)</td>
<td>$r = 0.39$ ($p = 0.000$)</td>
<td>$r = 0.44$ ($p = 0.000$)</td>
</tr>
</tbody>
</table>

Note. TUG = Timed Up & Go; KATZ = KATZ ADL-staircase
H₁: Step-wise Multiple Regression

Is there a relationship between functional independence (KATZ), and fear of falling?

Variables entered into the analysis:

- Level of functional independence KATZ
- Gender
- # Medications
- Age
- FES
- Self-reported fear of falling
- # of Diagnoses
## Stepwise Multiple Regression

<table>
<thead>
<tr>
<th>Variables</th>
<th>KATZ ADL a (DV)</th>
<th>Fear b</th>
<th>FES c</th>
<th>Age d</th>
<th>Meds e</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear b</td>
<td>.57 ***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>.43***</td>
<td>.09</td>
<td>.39</td>
</tr>
<tr>
<td>FES c</td>
<td>.43 ***</td>
<td>.32 ***</td>
<td>1</td>
<td></td>
<td></td>
<td>.25**</td>
<td>.08</td>
<td>.26</td>
</tr>
<tr>
<td>Age d</td>
<td>.29 **</td>
<td>.16</td>
<td>.02</td>
<td>1</td>
<td></td>
<td>.14**</td>
<td>.05</td>
<td>.22</td>
</tr>
<tr>
<td>Meds e</td>
<td>.36***</td>
<td>.39***</td>
<td>.29**</td>
<td>.07</td>
<td>1</td>
<td>.11*</td>
<td>.05</td>
<td>.18</td>
</tr>
</tbody>
</table>

\[ R^2 = .47 \]

Adjusted \[ R^2 = .45 \]

\[ R = .68*** \]

Note. a KATZ ADL = Activities of Daily Living; b Fear = Subjective report of fear of falling; c FES = Falls Efficacy Scale; d Age = Participant’s age in three categories; e Meds = number of medications in four categories;  
* \( p \leq .05 \), ** \( p \leq .01 \), *** \( p \leq .001 \)
RESULTS: FINAL MODEL
WHAT PREDICTS FUNCTIONAL INDEPENDENCE?

✓ Subjective reported *fear of falling*
✓ FES
✓ Age
✓ Number of Medications

\[ F = 20.70 \ (4, \ 94), \ p = .000, \ R^2 = .47 \]
H₂: Step-wise Multiple Regression

Does *fear of falling* contribute to the prediction of history of falls beyond that of known fall risk factors?

**Variables entered into the analysis:**

- Falls reported for the past three months
- Gender
- # Medications
- Age
- FES
- Self-reported *fear of falling*
- # of Diagnoses.
Final Stepwise Multiple Regression Model of Falls Efficacy Scale, Subjective reported Fear of Falling, Number of Medications, Gender, Age, and Number of Diagnoses on Falls reported for the past three months

<table>
<thead>
<tr>
<th></th>
<th>Falls a (DV)</th>
<th>Dx. b</th>
<th>Gender</th>
<th>FES c</th>
<th>Fear d</th>
<th>Meds</th>
<th>Age</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dx.</td>
<td>.29*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.39***</td>
<td>.09</td>
<td>.41</td>
</tr>
<tr>
<td>Gender</td>
<td>-.19</td>
<td>.09</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.26*</td>
<td>.12</td>
<td>-.20</td>
</tr>
<tr>
<td>FES</td>
<td>.09</td>
<td>.23*</td>
<td>-.03</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear</td>
<td>.15</td>
<td>.34***</td>
<td>.37***</td>
<td>.32***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meds</td>
<td>-.03</td>
<td>.41***</td>
<td>.07</td>
<td>.26*</td>
<td>.4***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.24*</td>
<td>.16</td>
<td>.03</td>
<td>.02</td>
<td>.16</td>
<td>.07</td>
<td>1</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

\[ R^2 = .19 \]

Adjusted \[ R^2 = .17 \]

\[ R = .44^* \]

Note. a Falls = number of falls in four categories; b Dx. = number of diagnoses in four Categories; c FES = Falls Efficacy Scale; d Fear = reported fear of falling; * \( p \leq .05 \). ** \( p \leq .01 \). *** \( p \leq .001 \)
RESULTS: FINAL MODEL
WHAT PREDICTS HISTORY OF FALLS?

Number of diagnoses and age contributed to prediction of falls reported over past three months

\[ F = 11.3 \ (2, \ 96), \ p = .000, \ R^2 = .19 \]

The final model accounted for 19% of the variance. The addition of gender only slightly increased \( R^2 \) from .15 with number of diagnoses to .19 with number of diagnoses and gender.
EXPLORATORY PATH ANALYSIS

Variables included in the path analysis:

- Number of diagnoses
- FES score
- Reported *Fear of Falling*
- Age
- Gender
- Number of prescribed medications
- Frequency of falls over the past three months
Reduced Model after Analysis

- Number of diagnosis
  - 0.43
  - Gender
  - 0.22
  - Frequency of falls
    - -0.26

- Number of medications
  - 0.42
  - 0.45
  - 0.14

- e1: 0.50
- e2: 0.31
STUDY LIMITATIONS

- Recruitment strategy: Participants were recruited from home-health patients served by two local agencies. Therefore this was not a random sample recruited from the general population.

- Home-health patients: Health was already compromised and therefore may not be representative of community dwelling adults in general.

- Health was already compromised influencing sensitivity to fear of falling.
STUDY LIMITATIONS

- Participants may have demonstrated greater independence when performing activities of daily living during the assessment because they were completing these tasks in the presence of a certified occupational therapist that used a gait belt during all observations.

- This creates a methodological challenge for future studies assessing the relationship between fear of falling and observed ADL performance. Findings reported from past studies were primarily based on a self-reported level of function rather than objective measures of functional performance.
Consistent with past findings, participants who scored above a 70 on the FES showed an increased level of dependence on the KATZ ADL-staircase.

Asking participants about *fear of falling* directly as well as about their perceived susceptibility and perceived severity added to our understanding of what contributes to a person’s functional independence.

The FES and subjective reported *fear of falling* added predictive value to understanding the participants’ functional independence. Although these two variables were significantly correlated, their correlation was low. This would suggest that the subjective question about *fear of falling* and the FES tap into different aspects of this emotional response.
CONCLUSIONS

➢ The results of the first hypothesis demonstrated that fear of falling did not influence number of falls.

➢ Further analysis of the data: falls correlated to # diagnoses, # of medications, age and gender. This was of interest given that a majority of older adults in this study reported that they had fallen while performing activities of daily living and they feared future fall occurrences.

➢ However, performing ADL as part of the assessment for this study is not representative of how they would perform these activities without the occupational therapist standing by for their safety. This may have biased their performance thereby masking the extent to which fear of falling could be related to number of falls.
Implications for Occupational Therapy Practice

- Center for Disease Control has made it a priority to challenge medical disciplines to implement fall intervention programs with documented effectiveness (Healthy People 2020).
- Relevant to the field of occupational therapy because the discipline strives to influence occupational performance throughout a person's lifespan. The older adults in this study, whose health was already compromised, were observed while performing activities of daily living within their home environment. Specific barriers to independent function were identified during the process of performing activities of daily living tasks and it is these barriers that need to be addressed when designing intervention programs.
- Targeting single skills to prevent falls has not been shown to be effective in fall prevention. Interventions need to address multi-body functions (cognitive, sensory, neuromusculoskeletal, behavioral and cardiovascular) (WHO, 2001) as required to complete functional activities rather than practicing a specific skill such as balance (AOTA, 2008).
Due to the high number of deaths among adults as a result of falls, the Center for Disease Control has made it a priority to challenge medical disciplines to implement fall intervention programs with documented effectiveness (Healthy People 2020).

This challenge is especially relevant to the field of occupational therapy because the discipline strives to influence occupational performance throughout a person's lifespan.
Unique position to address both the psychosocial components of performance such as a fear of falling as well as the physical components (physical limitations, understanding medication regimens and side effects, and environmental modifications) when designing treatment interventions.

Interventions need to incorporate assessment of physical abilities as well as the emotional perception of threat related to falls when performing activities of daily living.

Occupational therapists have the foundational knowledge to address emotional and physical barriers impacting occupational performance while incorporating compensatory strategies to prevent future falls and increase functional independence.
QUESTIONS ?


Borderrac.org. **Date:** September 26, 2013 at 11:20:29 AM MDT


REFERENCES


