The FARE

A new way to express Falls Risk among older persons including physical activity as a measure of Exposure

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Falls among older persons (55+) in the Netherlands

• Each year:
  
  • 88,000 Treatments at ER
  
  • 32,000 Hospital admissions (78% fractures)
  
  • 1,800 Fatalities
  
  • High falls injury risk among older persons 75+
  
  • About 30% older persons fall at least once
  
  • Direct medical costs: 550 million Euros (700 million USD)
General assumption

• Persons will not fall if:
  • their capability to control balance
  • is greater than
  • the demands put on it.
The occurrence of a fall; capability-demand
Safety of system or person

• Product of:

  • Probability of having an accident/injury given a unit of exposure

  • Observed level of exposure

Concept of exposure related to falls

- Exposure is zero if a person does not move (PA level =0)

- Exposure increases if PA level >>0
Exposure as a precondition for falls

Exposure

Extrinsic risk factors
Balance control
Demands

Intrinsic risk factors
Balance control
Capability

Falls incidence

Behaviour (physical activity)
Falls research models do not take exposure into account

Riskfactor research
- Balance
- Muscle strength

Intervention evaluation research
- Intervention group
- Control group

Outcome measure
- Falls incidence/1000 person-years
Is exposure important in falls research?

• No, if:
  • There are no differences in exposure among older persons
  • If exposure measures show no relation with falls
Any differences in exposure among older persons?

- Subjects were asked for both summer and winter about:
  
  - The number of days during an average week at which they were physically active for at least 30 minutes at a moderate level (at least as heavy as brisk walking or bicycling).
Number of physical active days per week by age (N= 21,020) IPAN data 2000-2005
Exposure by balance difficulty among community dwelling older persons (70+), N=704

Wijlhuizen et al, Prev Med, 2010
Distributions of falls at home (n=305) (top) and physically active person-hours at home (n=459) among community dwelling older persons 65+
Distribution of ratio falls/ per active person-hours at home (Spearman cor = .89)

Conclusions

• There are large differences in exposure (PA) among older persons

• Exposure (PA) measure shows strong relation with falls

• Therefore:
  • We should take exposure into account in falls research

The Falls risk by Exposure (FARE)

- Common expression of falls risk:
  - Number of falls/ 1000 person-years

- The FARE:
  - Number of falls/ 1000 physically active person-days

Wijlhuizen et al, Prev Med, 2010
Falls injury risk ratio by age expressed by Incidence/FARE (N= 21,020) IPAN data 2000-2005

<table>
<thead>
<tr>
<th>Age</th>
<th>Falls risk ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>55-59</td>
<td>1</td>
</tr>
<tr>
<td>60-64</td>
<td>1,5</td>
</tr>
<tr>
<td>65-69</td>
<td>2</td>
</tr>
<tr>
<td>70-74</td>
<td>2,5</td>
</tr>
<tr>
<td>75-79</td>
<td>3</td>
</tr>
<tr>
<td>80-84</td>
<td>3,5</td>
</tr>
<tr>
<td>≥ 85</td>
<td>5</td>
</tr>
</tbody>
</table>

Falls injury incidence
FARE score
Falls risk ratio by level of Balance control difficulty expressed by Incidence/FARE (N=704)

Wijlhuizen et al, Prev Med, 2010
Final conclusions

- We should take exposure into account in falls research
  - Because:
    - There are large differences in exposure (PA) among older persons
    - Exposure (PA) measure shows strong relation with falls
    - Actual falls risk is generally strongly underestimated compared to the FARE
  - We do not have an exposure measure which is agreed upon