A clinical prediction tool that includes modifiable risk factors predicted functional decline in elderly women


**Question**
Is a clinical prediction tool that includes modifiable risk factors accurate for predicting functional decline in older women living in the community?

**Design**
A cohort study, the Study of Osteoporotic Fractures, provided data for derivation (random two thirds of cohort) and validation (remaining one third of cohort) of the prediction tool.

**Setting**
3 U.S. cities.

**Patients**
6632 of 9704 women (mean age 73 y) ≥ 65 years of age who were recruited from population-based listings. Exclusion criteria were black race, inability to walk without the assistance of another person, and bilateral hip replacement. Women from the original cohort who had died; were lost to follow-up; and had incomplete or missing data for exercise level, depressive symptoms, social networks, or physical performance were also excluded from the analysis.

**Description of prediction guide**
Separate rules were developed for predicting functional decline in vigorous activities and in basic activities. Modifiable predictors of functional decline in vigorous activities (P ≤ 0.1) were slow gait (2 points), use of short-acting benzodiazepines (2 points), depression (2 points), low exercise level (1 point), body mass index ≥ 29 (1 point), and weak grip strength (1 point). Predictors of decline in basic activities were slow gait (2 points), depression (1 point), long-acting benzodiazepine use (1 point), short-acting benzodiazepine use (1 point), low exercise level (1 point), visual acuity < 20/40 (1 point), and body mass index ≥ 29 (1 point). The risk for functional decline was obtained by adding the points for each rule.

**Main outcome measures**
Functional decline was defined as a self-reported loss of ability over the 4-year study interval to perform ≥ 1 of 5 vigorous activities (e.g., shopping for groceries) or ≥ 1 of 8 basic activities (e.g., dressing yourself).

**Prediction of functional decline in elderly women**

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Score</th>
<th>Derivation</th>
<th>Validation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability of decline in vigorous activities</td>
<td>0 to 1</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>2 to 3</td>
<td>25%</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>≥ 4</td>
<td>39%</td>
<td>39%</td>
</tr>
<tr>
<td>Area under ROC curve</td>
<td>0.67 (± 0.01 SE)</td>
<td>(0.61)* (± 0.01 SE)*</td>
<td></td>
</tr>
<tr>
<td>Probability of decline in basic activities</td>
<td>0 to 1</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>≥ 2</td>
<td>10%</td>
<td>7%</td>
</tr>
<tr>
<td>Area under ROC curve</td>
<td>0.76 (± 0.02 SE)</td>
<td>(0.66)* (± 0.02 SE)*</td>
<td></td>
</tr>
</tbody>
</table>

*Data provided by author.

**Commentary**
Sarkisian and colleagues have developed a relatively simple-to-administer predictive tool to stratify risk for developing functional decline over a 4-year period. A high score on the scale was associated with a 2- to 3-fold increase in the risk for functional decline. The tool was developed using data from relatively healthy, primarily community-dwelling women and should not be extrapolated to such populations as nursing home residents. Previous analyses of epidemiologic data have identified numerous risk factors predictive of functional decline (1-2), many of which are not modifiable. The prediction rule used by Sarkisian and colleagues is novel in that it only included potentially modifiable risk factors. Thus, the tool had a lower predictive value than would a tool that included all factors. However, it showed that a substantial portion of the variation of functional decline in this cohort could be attributed to factors that a clinician in partnership with the patient could modify. As the authors acknowledge, the benefit of including only modifiable factors hinges on the assumption that improving these factors will result in a lower chance of developing subsequent functional decline. Recently, several trials of multifactorial interventions that addressed many of these risk factors succeeded in decreasing functional decline (3-5). Further research is required to determine whether and to what extent these benefits can be sustained.

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**References**