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

Sarkisian CA, Liu H, Gutierrez PR, et al., for the Study of Osteoporotic Fractures Research Group. **Modifiable risk factors predict functional decline among older women: a prospectively validated clinical prediction tool.** J Am Geriatr Soc. 2000 Feb;48:170-8.

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 ($P \leq 0.1$) 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).

MAIN RESULTS

The prediction rule stratified women from the derivation sample into 3 risk groups for decline in vigorous activities and 2 risk groups for decline in basic activities; similar probabilities were found for the validation sample (Table).

CONCLUSIONS

Among elderly women living in the community, a clinical prediction rule that included 6 modifiable risk factors predicted risk for decline in vigorous activities. A separate rule that included 7 factors predicted decline in basic activities.

Source of funding: U.S. Public Health Service.

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Prediction of functional decline in elderly women

Outcomes	Score	Derivation	Validation
Probability of decline in vigorous activities	0 to 1	12%	14%
	2 to 3	25%	27%
	≥ 4	39%	39%
	Area under ROC curve	0.67 (± 0.01 SE)	{0.61}* {± 0.01 SE}*
Probability of decline in basic activities	0 to 1	2%	2%
	≥ 2	10%	7%
	Area under ROC curve	0.76 (± 0.02 SE)	{0.66}* {± 0.02 SE}*

*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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