Validity of the PROMIS Physical Performance Scale in Determining Frailty and Physical Ability in Community-Dwelling Elderly

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Purpose

In many clinical settings, therapists are continuously seeking efficient and valid assessments for older adults to determine their physical abilities and functional status. The Patient Reported Outcome Instrument System (PROMIS) is a newly developed computer adapted test (CAT) that is being incorporated into electronic medical records and has been reported to assess a person's physical function. The current gold standard to assess different levels of frailty and physical function in older individuals is the Modified Physical Performance Test (mPPT). However, the mPPT is a lengthy performance based outcome measure that takes time to administer. The purpose of this study is to determine a more quick and efficient test to determine physical function.

Hypothesis

The PROMIS will be correlated with the mPPT and its individual items related to physical function in community-dwelling older adults who have multiple comorbidities. If there is a correlation between these outcome measures, it would give therapists an option to use an individualized item or a self-report measure to determine physical function and frailty level.

Participants

49 community-dwelling older individuals from Newberg, Oregon were recruited over a 3-month period. 3 people were excluded from the study due to the exclusion criteria, 46 participants (77 ± 4.6 years; 27 females, 19 males) were included in the analysis.

Exclusion Criteria:
- Mini Mental State Exam <26 out of 36 points (28.4 points ± 1.5)
- Acute medical conditions within the past 6 months
- Currently receiving home health services

Methods

Participants completed the mPPT (29.1 points ± 3.7), which included tasks such as the 5-time sit-to-stand (STS), climbing one flight of stairs, placing a book on a shelf, donning/doffing a coat, picking up a penny, and walking 50-feet. These tasks were performed randomly throughout the session to reduce bias between the tests. All participants were provided with clear instructions and demonstration prior to a task. Statistical analysis included the Pearson correlation and multiple linear regression to determine the relationship between the patient characteristics, mPPT timed tasks and the PROMIS functional scale to determine which showed the most potential to simplify the functional assessment.

Results

Items in the mPPT	PROMIS
5-time STS	r= -.473 p= .001
50-feet walk test	r= -.641 p= .000
Picking up a Penny	r= -.465 p= .001
Climbing one flight of stairs	r= -.535 p= .000
Placing a book on a shelf	r= -.316 p= .036
Donning/doffing a coat	r= -.277 p= .069

Table 1. Pearson product moment correlation was calculated for each timed item in the mPPT versus the PROMIS score. A p-value of < .05 is considered significant.
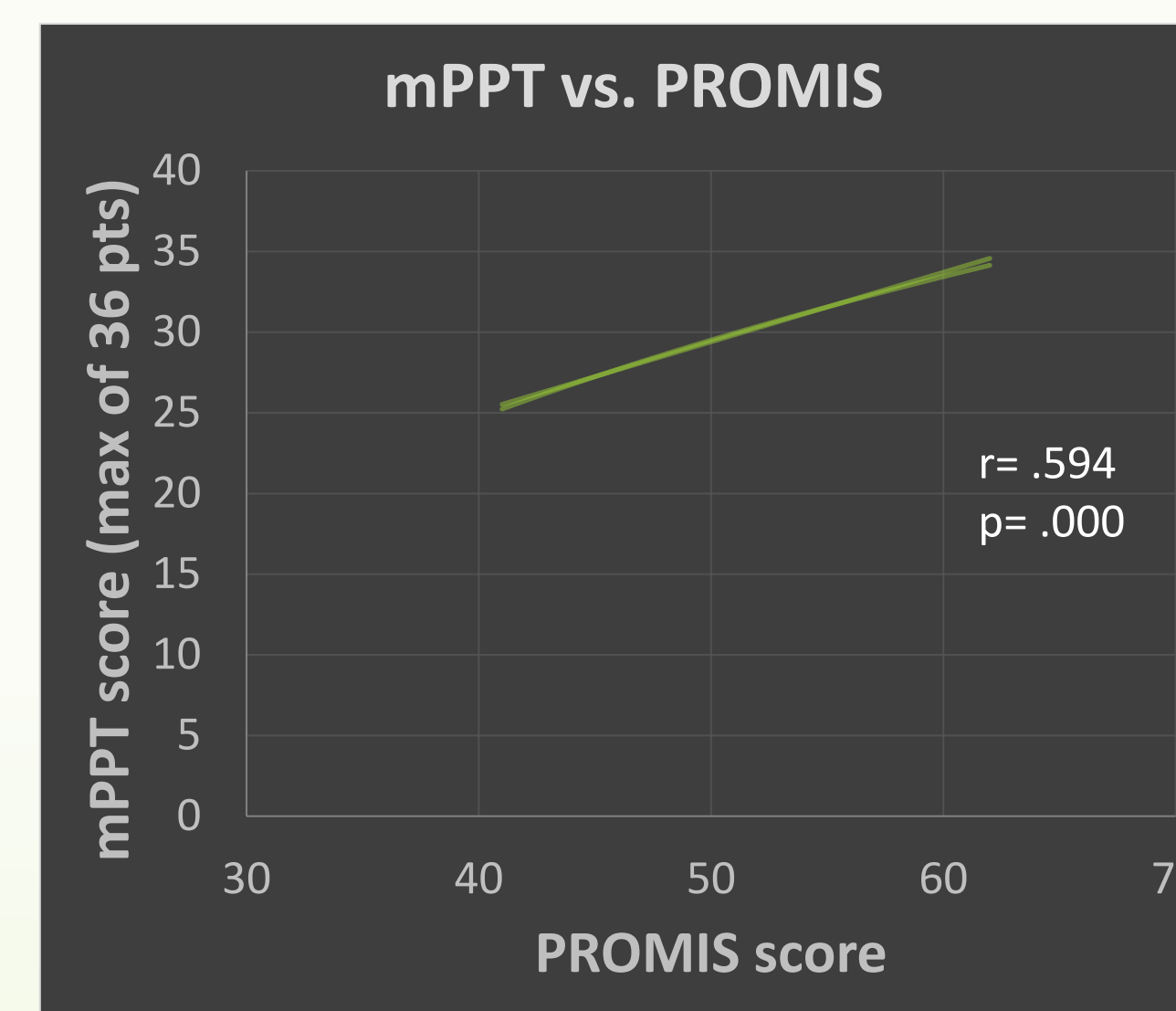
Graph 1. Pearson correlation of the mPPT and the PROMIS physical function scale. A p-value of < .05 is considered significant.
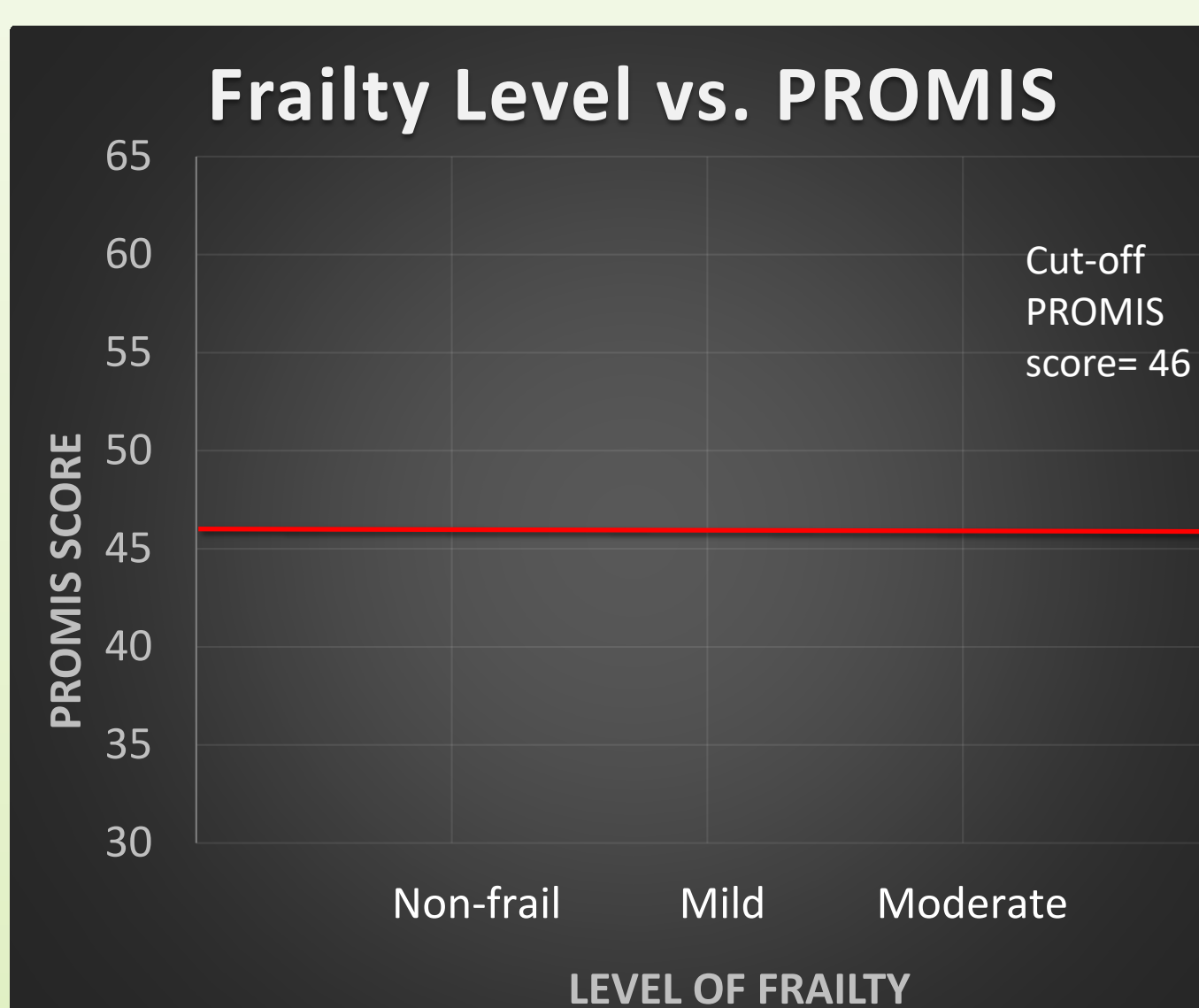
Graph 2. Individual PROMIS physical function scores separated by the participant's level of frailty according to the mPPT.

		Frailty		
		Present	Absent	Total
PROMIS score Cut-off= 46 pts	Test (+) ≤ 46 pts	5	12	17
	Test (-) > 46 pts	0	29	29
	Total	5	41	46
		Sensitivity = 100% Specificity = 71%		

Table 2. Calculating the sensitivity and specificity of the PROMIS (cut-off score of 46 points) to find those who are considered frail. "Frailty present" includes participants who are moderately frail. "Frailty absent" includes participants who are "non-frail" and "mildly frail".

Table 3. Model Summary

Variables entered	R	R Square	Adjusted R Square	Std. Error of the Estimate	Significance
BMI, age, PROMIS	.743	.552	.518	2.601	.000

a. Predictors: (Constant), BMI, Age, PROMIS
b. Dependent variable: mPPT

Discussion

- The best item within the mPPT that was correlated with the PROMIS was the 50-foot walk test, which is related to gait speed (Table 1). The correlation is higher than the mPPT vs. the PROMIS, which may suggest that gait speed is significantly related to self-reported physical function.

  - Statistical analysis of the data revealed that the best independent predictors of the mPPT were the participants' BMI, age and PROMIS physical function scores. An increase in age or BMI was correlated to a decrease in the mPPT score. In contrast, when the PROMIS alone was compared to the mPPT, there was a significant, but low correlation (Graph 1). When those factors are combined, there is a significant relationship to the mPPT scores (Table 3).

- There was no good correlation or discrimination of frailty level with the PROMIS (Graph 2). This finding indicates that the PROMIS function scale should not replace a physical performance test. Instead, it can be used as a screening tool, prior to administering the mPPT, to further determine frailty in a community-dwelling population.

Declarative Statements

- A PROMIS cut-off score of 46 points has 100% sensitivity, suggesting that the PROMIS can be used as a screening method to rule out frailty among individuals in the clinic before utilizing the mPPT.

- The PROMIS physical function scale, which is new and validated, has no ceiling or floor effect. It is quick, cost-effective easy to use compared to other patient-reported outcome measures.

- Age, BMI, and PROMIS combined is highly correlated to mPPT scores and should be taken into consideration in the clinical setting.

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