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Height of Chair Seat Influenced 30-Second Chair Stand Test in Community-Dwelling Older Adults

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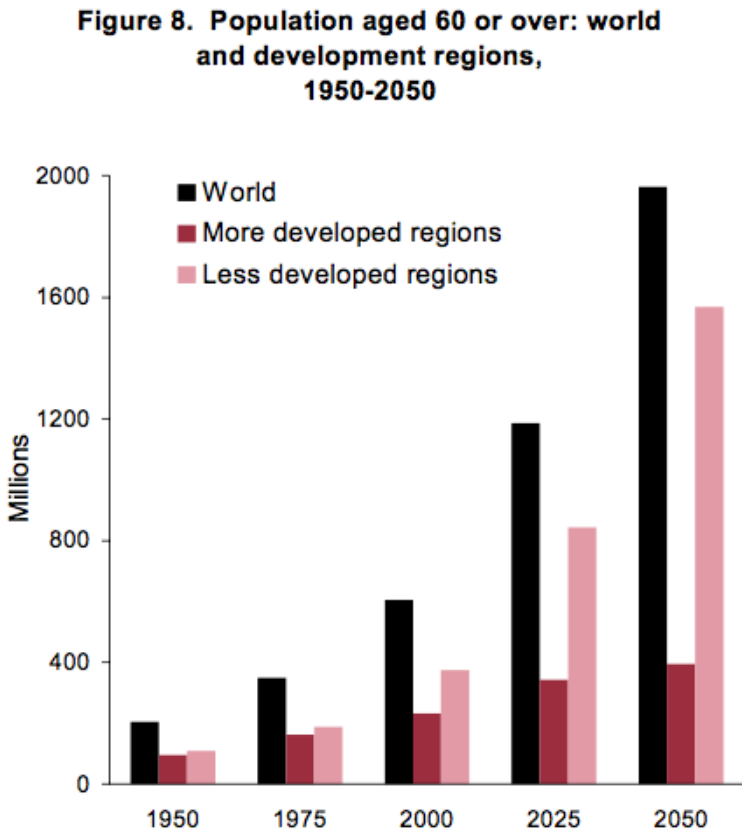
Background

- Population ageing presents enormous social, economic and political challenges for societies



United Nations (2001)

Background (cont'd)

- Rikli & Jones (1999)
  - 30-second chair stand test (30-s CST) to assess lower body strength
    - Test-rest reliability (ICC = 0.89)
    - Criterion validity (1RM leg press, r = 0.71-0.78)
  - Advantage
    - Easy to administrate, require only simple equipment and can be used in various settings

Background (cont'd)

- Older adults reported experiencing more difficulty and less success as chair seat height decreased (Weiner et al 1993)
- Use of a fixed height chair for 30-s CST may limit extent of the test to reflect lower body strength for each individual

Aim of Study

- To examine the influence of chair seat height on the 30-s CST in community-dwelling older adults

Methods

- 32 older adults aged ≥ 60 and living in community
- Exclusive criteria
  - Unable to stand up independently from a chair without hand support
  - Had medical conditions or cognitive limitations that prevent from following instruction or safely performing the test

Methods (cont'd)

Obtain written informed consent & basic information

↓

Measure lower leg length

- Distance from lateral knee joint line to floor in standing

↓

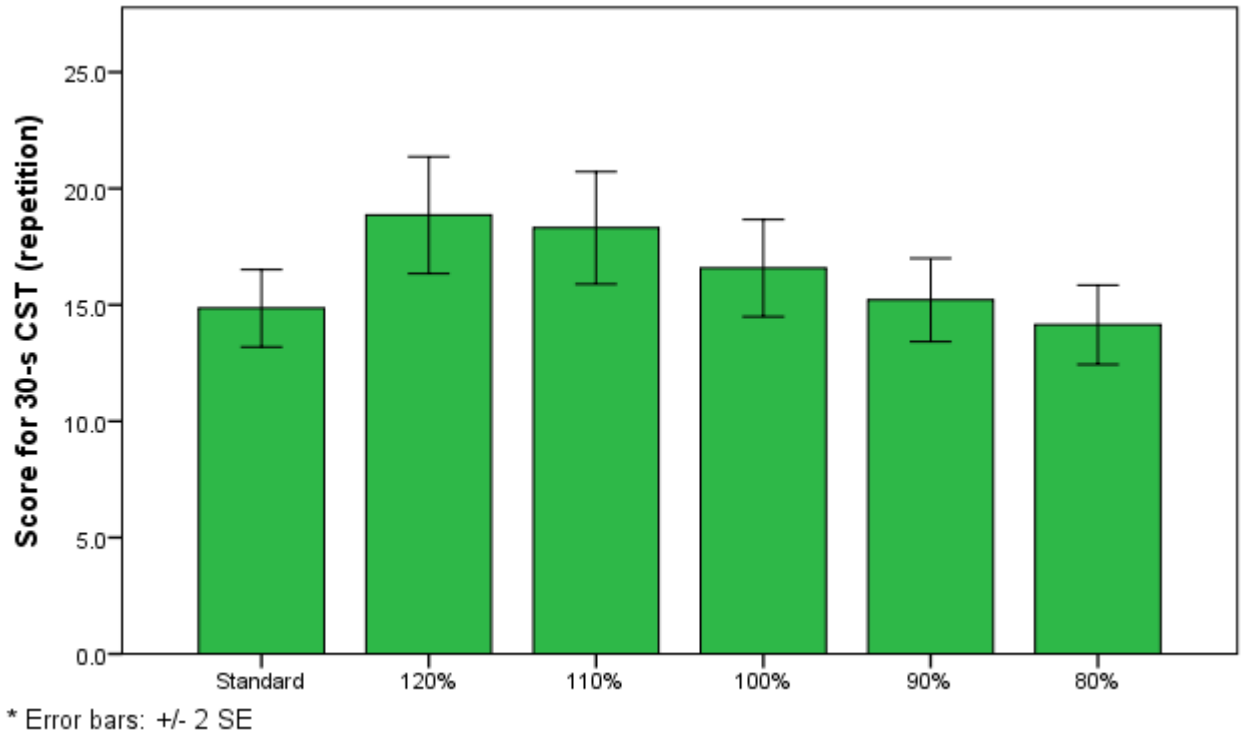
Perform 30-s CST (Rikli & Jones, 1999)

- Standard chair seat height (43 cm)
- Randomly selected chair seat heights (120%, 110%, 100%, 90% and 80% of lower leg length)

Methods (cont'd)

- Descriptive statistics
  - Mean and standard deviation (SD) for normally distributed continuous data
  - Frequency and percentage for categorical data
- Inferential statistics
  - One-way repeated measures analyses of variance (ANOVA) with post hoc tests, using Bonferroni correction
  - Statistically significant level set at $p < .05$

Results



Seat height condition

Results (cont'd)

Chair Seat Height	Mean Difference [95% CI]	p
Standard		
80%	0.7 [-1.3, 2.7]	> .950
90%	-0.4 [-2.0, 1.2]	> .950
100%	-1.7 [-3.5, 0.1]	.064
110%	-3.5 [-5.7, -1.2]	< .001
120%	-4.0 [-6.0, -2.0]	< .001

Discussion

- Compared to standard condition, 110% and 120% conditions resulted in significantly higher scores
  - Suggests that participants with shorter lower legs have advantage of performing 30-s CST with a fixed height chair
  - Contradicts to the finding by Mazza et al (2004)
    - Some participants with shorter lower legs were unable to stand up from descending seat heights during single CST

Conclusion

- When interpreting the score for the 30-s CST between individuals, the height of the chair seat relative to the lower leg length should be considered

- For older adults with shorter lower legs, the standard 30-s CST may overestimate their lower body strength

Thank You for Listening

References

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Results

Demographics	Values
Gender	14 males, 18 females
Age (year)	71.1 ± 5.5
Height (cm)	156.9 ± 8.2
Weight (kg)	61.8 ± 9.9
Body mass index (kg/m^2)	25.1 ± 3.2
Lower leg length (cm)	43.2 ± 3.1
Exercise regularly	23 (71.9%)
Have chronic diseases	22 (68.8%)

30-s CST

Results

30-s CST	60-69 yr (n=14)	70-79 yr (n=16)	80-89 yr (n=2)
Standard	15.1 ± 4.5	14.3 ± 4.2	16.8 ± 10.3
80%	14.5 ± 4.7	13.9 ± 4.8	13.0 ± 6.4
90%	15.5 ± 4.5	15.0 ± 5.2	14.8 ± 8.8
100%	17.1 ± 6.3	16.2 ± 5.4	16.3 ± 9.5
110%	18.5 ± 6.6	18.2 ± 6.8	17.0 ± 9.9
120%	19.2 ± 7.3	18.5 ± 6.4	18.0 ± 12.7

Results (cont'd)

Chair Seat Height	Mean Difference [95% CI]	p	Mean Difference [95% CI]	p
Standard	(reference)		-	-
80%	0.7 [-1.3, 2.7]	> .95	2.4 [1.1, 3.7]	< .001
90%	-0.4 [-2.0, 1.2]	> .95	1.4 [0.2, 2.5]	.009
100%	-1.7 [-3.5, 0.1]	.064	(reference)	
110%	-3.5 [-5.7, -1.2]	< .001	-1.7 [-2.8, -0.7]	< .001
120%	-4.0 [-6.0, -2.0]	< .001	-2.3 [-3.8, -0.8]	.001

Discussions

- Mean score for 30-s CST greater than results in previous studies
  - Rikli & Jones (1999)
    - 14±2.4 (60-69 yr), 12.9±3.0 (70-79 yr) and 11.9±3.6 (80-89 yr)
  - MacFarlane et al (2006)
    - 11.3-14 (60-69 yr), 9.4-11.6 (70-79 yr), 8.3-11.1 (80-89 yr)

Discussions (cont'd)

- Comparisons between 80%, 90%, 100%, 110% and 120% conditions
  - 100% condition was significantly different than the other conditions
  - No significant differences between 100% and 90% or 110% conditions during single CST (Demura & Yamada, 2007)