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Correlates of Hand Grip Strength and Activities of Daily Living in Elderly Sri Lankans

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To the Editor

Sri Lanka is one of the most rapidly aging countries in Asia. As life expectancy continues to increase, projected to reach 71.1 and 80.8 years for men and women respectively by 2016(1), it is important to better understand which factors impact the health of its elderly. Handgrip strength (HGS) and Activities of Daily Living (ADL) are measures of physical strength and functional capability that are correlated with overall health in the elderly (2). Gender, age, education, psychological distress, cognitive function, self-rated health (SRH), and comorbidities have frequently been associated with HGS and ADL in Western populations (3–5). However, it is unclear whether these associations are present in Sri Lanka's elderly, especially since ethnic differences have been found in previous studies (6) and no studies have assessed these associations in this population. Therefore, we aim to determine the extent to which characteristics found to be significant predictors of HGS and ADL in other populations are also important correlates among elderly Sri Lankans.

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METHODS

A cross-sectional survey was conducted among 252 elders aged 60–92 years living in the Galle District of Sri Lanka. Outcome measures were HGS (measured with Hand Grip Meter) and ADL Score (sum of Instrumental Activities of Daily Living and Physical Activities of Daily Living scores; range 0–28; higher score represents better functional capability). Eight potential correlates of HGS and ADL: gender, education (secondary school or less vs. beyond secondary school), age, cognitive function (Montreal Cognitive Assessment: MoCA), psychological distress (Kessler-10), recent injury (yes/no), number of physical illnesses and SRH (responses: very good, good, moderate, bad and very bad) were assessed by self-report. Potential correlates were assessed using multivariate linear regression analysis (forward selection method).

RESULTS

Mean age was 71.7 ± 8.2 years, 67% of the elderly were women, 67% had secondary level education or lower, 23% had suffered an injury in the last 60 days and 48% rated their health to be moderate while 31% viewed it as bad. There was a positive correlation between HGS and ADL score, $r = 0.5$, $p < 0.001$. Table shows the results of the multivariate analyses. Model A, which only includes the significant correlates of HGS, shows that better SRH is positively correlated with HGS. Model B, which only includes the significant correlates of ADL, shows that psychological distress is negatively correlated with ADL function. Models A and B show that age is a significant negative correlate, and cognitive function is a significant positive correlate of HGS and ADL.

DISCUSSION

As previously reported, HGS and ADL score were significantly correlated with each other(2). Of the significant correlates of HGS and ADL, cognitive function, SRH and psychological distress are to some extent modifiable.

One explanation for the association between low HGS and poor cognitive function is the presence of shared pathogenesis like oxidative stress and high inflammatory markers, which may contribute to both muscle loss and cognitive decline (7). Assessment of inflammatory markers could be a potential target of intervention. Another possible explanation for this association may be difficulty with comprehension, which could also explain the association seen between ADL and cognitive function as some of the tasks asked about (ex. managing finances) require complex cognitive processes to perform (8).

A possible explanation for the association between SRH and HGS is that SRH could better capture disease conditions than other variables (ex: number of illnesses) because it takes into account a broader range of information (ex: disease symptoms) that could be excluded by standardized measures(9). Regarding psychological distress and its association with ADL, it is possible that symptoms caused by psychological distress (ex: insomnia and fatigue), could increase susceptibility to disease and lead to functional decline over time(10). Empirical evidence has pointed to the risks and protective factors for psychological distress, which fall into three categories, sociodemographic and stressrelated factors (ex: poverty) and personal

resources (ex: income) (10). Improvement of these factors could help alleviate symptoms of psychological distress and ultimately mitigate adverse impact on functional capability.

Although this study is limited by its small sample size and cross sectional design, it is to our knowledge the first conducted among the elderly in Sri Lanka on HGS and ADL and their correlates. Given Sri Lanka's increasing life expectancy, rapidly growing elderly population and relatively limited resources, there is value in encouraging policy makers to place emphasis on maintaining cognitive function and SRH, and reducing psychological distress amongst Sri Lanka's elderly.

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Table

Correlates of Hand Grip Strength (Model A) and Activities of Daily Living (Model B): Multivariate Linear Regression

Correlates	Model A (HGS) Beta (SE)	Model B (ADL) Beta (SE)
Intercept	23.10 (0.66) ⁺	24.10 (0.22) ⁺
Age	-0.22 (0.04) ⁺	-0.18 (0.03) ⁺
Cognitive Function (MoCA)	0.21 (0.05) ⁺	0.30 (0.04) ⁺
Female Gender	-8.26 (0.64) ⁺	
SRH: Very Good	8.45 (2.62) ^{**}	
SRH: Good	2.72 (0.86) ^{**}	
SRH: Moderate	1.39 (0.69) [*]	
SRH: Bad	Reference	
Psychological distress		-0.17(0.04) ⁺

ADL= Activities of Daily Living; HGS=Handgrip Strength; SE = Standard Error; SRH= Self-Rated Health; MoCA = Montreal Cognitive Assessment (Score > 26 is normal)

*
 $p < .05$;

**
 $p < .01$;

⁺
 $p < .001$.

R^2 = 0.63 (for Model A); 0.47 (for Model B)