

# Brief Report

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*The Gerontologist*  
Vol. 48, No. 3, 388-393

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## Impairment in Instrumental Activities of Daily Living and the Geriatric Syndrome of Self-Neglect

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**Purpose:** We sought to characterize self-neglect definitively as a geriatric syndrome by identifying an association with functional impairment. **Design and Methods:** We performed a cross-sectional home evaluation of 100 community-living older adults referred by Adult Protective Services for geriatric self-neglect and 100 matched adults from a community geriatrics clinic. We made our assessments by using two manual muscle tests, a timed-gait test, a modified Physical Performance Test (mPPT), and the Kohlman Evaluation of Living Skills (KELS). **Results:** Participants in the self-neglect group had impaired mPPT ( $p < .077$ ) and KELS ( $p < .001$ ) scores compared with community-controls. Using analysis of covariance models, we found that self-neglect referral

explained a significant proportion of the variance in KELS scores (32%;  $p < .001$ ) but not in mPPT scores (22%;  $p = .49$ ). **Implications:** The geriatric syndrome of self-neglect is associated with increased morbidity and mortality and appears to be independently associated with impairments in instrumental activities of daily living. The evaluation and treatment of geriatric self-neglect should be consistent with that of other geriatric syndromes.

**Key Words:** *Elder mistreatment, Functional assessment, Geriatric self-neglect, Geriatric syndrome*

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This study is part of the Consortium for Research in Elder Self-Neglect of Texas (C. B. Dyer, Principal Investigator) and was funded by a National Institute of Health grant (P20-RR020626) under the Roadmap Initiative. Dr. Naik receives additional support from the National Institute of Aging (K23AG027144), a bioethics grant from the Greenwall Foundation, and the Department of Veterans Affairs. Dr. Dyer receives additional grant support from the Department of Justice. Preliminary results were presented at the National Meeting of the American Geriatrics Society on May 5, 2007 in Seattle, WA.

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We thank Becky Novelli, OTR, for her assistance in the training of the research team and Sharon L. Olson, PT, PhD, for her assistance with the interpretation of measurements from the manual muscle tests.

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Self-neglect in older adults is a spectrum of behaviors defined as the failure to (a) engage in self-care acts that adequately regulate independent living or (b) take actions to prevent conditions or situations that adversely affect the health and safety of oneself or others (Clark, Mankikar, & Gray, 1975; Lauder, 2001; Pavlou & Lachs, 2006). Self-neglect is the most common reason for referral to Adult Protective Services (APS), the governmental organization mandated to investigate cases of elder abuse and neglect in most jurisdictions (Dyer & Goins, 2000; Lachs, Williams, O'Brien, Hurst, & Horwitz, 1996). Two national studies reported the prevalence of self-neglect to be 50.3% (National Center on Elder Abuse, 1998) and 37.2% (Teaster et al., 2006) of all elder abuse and neglect cases

reported to APS. Self-neglect is an increasingly common and resource-intensive public health problem, with a 44% increase in reported cases over a 4-year period (2000 to 2004) requiring an average state appropriation of \$8.5 million to fund APS programs (Teaster et al.). These expenditures translate to a national public health burden of just under a half-billion dollars, before one considers the first dollar for medical care.

Given the increased prevalence of self-neglect in later life and the adverse health consequences associated with it, self-neglect has been characterized as a potential geriatric syndrome (Dyer & Goins, 2000; Pavlou & Lachs, 2006; Pickens, Naik & Dyer, 2006). Geriatric syndromes (e.g., delirium, urinary incontinence, and falls) are characterized by multiple predisposing factors, presentation with other geriatric syndromes, associations with functional impairment and medical or psychiatric morbidities, and an independent risk factor for mortality (Tinetti, Inouye, & Gill, 1995; Tinetti & Fried, 2004). Recent studies have reported clear evidence linking self-neglect with many of the criteria, just described, for a geriatric syndrome (Dyer, Goodwin, Pickens-Pace, Burnett, & Kelly, 2007; Dyer, Pavlik, Murphy, & Hyman, 2000; Lachs, Williams, O'Brien, Pillemer, & Charlson, 1998; Pavlou & Lachs). However, evidence supporting an association between self-neglect and functional impairment or subsequent functional decline has been equivocal and limited as a result of confounding factors (Pavlou & Lachs).

To characterize self-neglect definitively as a geriatric syndrome, evidence is needed for an independent association with functional impairment, defined as a decline in the ability to perform one or more of the basic or instrumental activities of daily living. Our aim in the current study was to identify an independent association between self-neglect and functional impairment by using standardized measures of functional status in a community-living population of older adults.

## Methods

### Participants

Participants were members of the Consortium for Research in Elder Self-Neglect of Texas pilot study (Smith et al., 2006), a cross-sectional study conducted between March 2005 and October 2006 that enrolled 200 total older adults. Caseworkers with the APS Region VI of the Texas Department of Family and Protective Services assisted with the recruitment of 100 individuals, all of whom were 65 years of age or older, spoke English, were community-living residents of Harris County, and had APS verification of self-neglect derived from Texas Resource Code §48.002(a)(4), which stipulates a "failure to provide for one's self the goods or services, including medical services, which are necessary to avoid physical

or emotional harm or pain or the failure of a caretaker to provide the goods or services." After APS staff received authorization from their clients for the release of their names for study purposes, research personnel contacted potential participants for the self-neglect referral group (SN group) to set up a home visit in order to obtain consent. In addition, researchers recruited 100 community-living adults from the Geriatrics Clinic of the Harris County Hospital District and matched them for age, race, gender, and zip code with members of the SN group; these adults had no prior referral for or history suggestive of self-neglect. These participants constituted the community-living control group (CC group).

### Measures

Two research team members conducted a comprehensive geriatric assessment in the homes of each of the 200 study participants. Included in the comprehensive evaluation were demographic variables, a full history and physical examination, pill count of all medications, and measures of social supports. In addition to the functional status measures described in the following paragraphs, the assessments included a validated Health Status self-report (Idler & Angel, 1990), Mini-Mental State Examination (MMSE), and the 15-item Geriatric Depression Scale (GDS).

*Manual Muscle Testing by Use of a Handheld Dynamometer.*—We had a test administrator use a manual muscle-testing dynamometer (Lafayette Manual Muscle Test System Model 01163, Lafayette Instrument Company, Lafayette, IN) to objectively measure muscle strength for shoulder abduction and knee extension (Chandler, Duncan, Kochersberger & Studenski, 1998; Wang, Olson, & Protas, 2002). We did not have these tests performed if the participant had surgery in the previous 3 months or was experiencing significant pain. For measuring knee extension strength, the test administrator stabilized the lower extremity by placing her hand on the back of the leg to support the knee and then instructed the participant to fully extend and hold the leg while pressing down on the dynamometer. For measuring shoulder abduction strength, the administrator had the participant place his or her arm in a neutral position at the side with the elbow flexed at 90° and the palm facing the body. The test administrator placed the dynamometer on the outside of the upper arm just above the elbow. The research team obtained three measurements for each of the muscle groups tested.

*Eight-Foot Walk Test.*—Timed walk tests are measures of lower extremity function (Chandler et al., 1998; Wang, Olson, & Protas, 2005). Participants

walked at a pace they normally would walk in a grocery store. A measuring tape marked a clear 8-ft (2.4-m) pathway on the floor, and the test administrator instructed the participant to start walking a couple of steps before the beginning of the tape measure. The administrator recorded the faster of two trials, in seconds. The administrator also noted any assistive devices used such as a cane or walker.

**Modified Physical Performance Test.**—The Physical Performance Test (PPT) objectively assesses functional capabilities in the following domains of physical function: write a sentence, simulate eating, lift a book onto a shelf, pick up a penny from the floor, turn 360°, and take a timed 50-ft (15.2-m) walk (Reuben & Siu, 1990). The PPT is highly correlated with established measures of activity of daily living (ADL) performance and the Tinetti gait score and has demonstrated high interrater reliability and internal consistency (Reuben & Siu). For the current study, we eliminated the 50-ft walk item (in lieu of the 8-ft walk test) and we modified the PPT scale, with scores ranging from 0 to 24. The research team timed and scored each of the tasks by using validated criteria.

**Kohlman Evaluation of Living Skills.**—The Kohlman Evaluation of Living Skills (KELS) assesses ADLs in the following five areas: self-care, safety and health, money management, transportation and telephone, and work and leisure. The KELS is a tool that is commonly used by occupational therapists in clinical settings (Kohlman-Thomson, 1992). In addition, previous studies have established the convergent validity of the KELS with established ADL measures and the sensitivity of the KELS to identify older adults who are not capable of living safely and independently in the community (Zimnavoda, Weinblatt, & Katz, 2002). The scoring system ranges from 0 to 16, with a score  $\geq 6$  suggesting that the person cannot live independently without assistance. The research coordinator was trained by an experienced occupational therapist to use the KELS in community-based settings for the current study (Pickens et al., 2007).

### Statistical Analysis

We designed our analyses to test the hypothesis that group membership (SN group vs CC group) was significantly associated with declines in one or more measures of functional status. We calculated frequencies, proportions, and distributions for all baseline characteristics of the study population. We assessed distributional differences for ordinal and dichotomous variables by using Pearson chi-square analyses. We conducted independent-samples *t* tests to determine the mean differences between continuous variables as well as the bivariate relationship between group membership and the five functional

status measures: shoulder abduction, knee extension, 8-ft walk, modified PPT (mPPT), and the KELS. We chose functional status measures with a probability value of  $p \leq .10$  as the dependent variables for analysis in distinct analysis of covariance (ANCOVA) models.

To better understand potential modifiers of the relationship between self-neglect and functional status, we tested a series of five ANCOVA models. Model 1 (sociodemographic) consisted of five covariates: age, race, gender, monthly income, and education attainment. The covariates for Model 2 (social support) were living alone, marital status, and routine religious participation. Model 3 (health status) tested the effects of the covariates of self-rated health, number of chronic conditions, number of medications, MMSE score, and GDS score. Models 4 (for mPPT) and 5 (for the KELS) combined all the significant covariates from Models 1 through 3 for each of the dependent variables. Adjusted *R*-square values provide a quantitative estimate of the variance contributed by the independent variable after all covariates are factored. We chose two-tailed tests of significance with an alpha level of  $p < .05$  for these analyses.

### Results

The descriptive characteristics of the 200 study participants are shown in Table 1. In accordance with the matching protocol, there were no significant differences in age, race, gender, education, or monthly income between the SN group and CC group. The average age for both groups was older than 75 years, and the majority of individuals were female and African American. Participants in the SN group were more likely to live alone, take fewer medications, and report depressive symptoms, but they were less likely to report routine religious participation.

Table 2 describes the bivariate relations between SN group status and each of the five functional status measures. Only two functional status measures were quantitatively different between groups in this analysis. Compared with participants in the CC group, participants in the SN group had impaired mPPT and KELS scores. Over 20 participants in each group could not complete either manual muscle test or the 8-ft walk test; but there were no significant differences in missing values between the SN group and the CC group. In the SN group, nine participants refused or did not complete the mPPT and the KELS. All participants in the CC group completed the KELS and only three did not complete the mPPT.

Table 3 describes the magnitude of the association between SN group status and measurements on the mPPT and KELS instruments by use of ANCOVA models. The relation of self-neglect and impairment in mPPT scores is no longer significant in any of the

**Table 1. Baseline Characteristics of the Study Participants (N = 200)**

Characteristic	SN Group (n = 100)	CC Group (n = 100)	p
Age in years: <i>M</i> ± <i>SD</i>	76.5 ± 7.2	76.1 ± 6.9	.410
Female gender: <i>n</i> (%)	66 (66)	66 (66)	1.00
Education in years: <i>M</i> ± <i>SD</i>	10.83 ± 3.3	10.52 ± 4.5	.573
Monthly income (\$): <i>M</i> ± <i>SD</i>	891.24 ± 631.80	860.43 ± 427.73	.723
African-American race: <i>n</i> (%)	54 (54)	62 (62)	.252
Currently married: <i>n</i> (%) <sup>a</sup>	25 (25)	32 (32)	.292
Living alone: <i>n</i> (%)	49 (50)	35 (35)	.033
Routine religious participation: <i>n</i> (%) <sup>b</sup>	58 (65)	78 (83)	.006
No. of chronic conditions: <i>M</i> ± <i>SD</i>	5.25 ± 2.6	5.51 ± 2.5	.477
Medications: <i>M</i> ± <i>SD</i>	6.53 ± 4.8	8.36 ± 4.4	.006
Self-Rated Health Scale			.090
Excellent to good: <i>n</i> (%)	46 (47.9)	60 (60)	
Fair to poor: <i>n</i> (%)	50 (52.1)	40 (40)	
MMSE: <i>M</i> ± <i>SD</i>	23.90 ± 4.547	25.05 ± 3.998	.069
GDS: <i>M</i> ± <i>SD</i>	5.13 ± 3.379	3.34 ± 3.124	<.001

Notes: SN group = self-neglect referral group; CC group = community-living control group; MMSE = Mini-Mental State Examination; GDS = Geriatric Depression Scale.

<sup>a</sup>Participants not currently married include those who are single, divorced, or widowed.

<sup>b</sup>Participants were asked (yes–no) the following: “Do you routinely participate in religious activities (such as attend church, read the bible, watch religious television programs)?”

four multivariate models. In contrast, self-neglect status had a highly significant association with impairment in ADLs as measured by the KELS in each of the four models. Even after we factored in the significant covariates of age, income, gender, marital status, living alone, GDS score, and MMSE score, we found that self-neglect could independently explain approximately one third of the decline in KELS performance (see Model 5).

## Discussion

The current study found evidence for an association between the geriatric syndrome of self-neglect and impairments in instrumental ADLs. Older adults referred to APS for self-neglect, in contrast with comparable community-living older adults, were more likely to have poorer scores on mPPT and KELS instruments. The results on KELS testing are especially remarkable, as those referred for self-neglect had significantly poorer scores even when we removed the variance in functional status that was due to demographic, social support, and clinical factors. In contrast, there were no significant differences between the SN group and CC group in the shoulder abduction, knee extension, or 8-ft walk performance tests as well as scores on the MMSE.

Despite the significant clinical and public health consequences resulting from self-neglect in older adults, few studies have quantitatively evaluated the causes, diagnosis, or treatments of this condition in comparison to other older adults. To further our understanding of this condition, recent studies have attempted to characterize self-neglect as a geriatric syndrome building on the evidence of a multifactor

etiology as well as associations with other geriatric syndromes, comorbidities, and increased mortality (Dyer & Goins, 2000; Pavlou & Lachs, 2006; Pickens et al., 2006). The findings of the current study address an important remaining criterion for defining a geriatric syndrome for which definitive data were lacking. Functional impairment is fundamental to the assessment of the geriatric patient and is characteristically described as a decline in the ability to perform one or more of the basic or instrumental ADLs. By this definition, the mPPT and KELS tests may be better assessments of basic and instrumental ADLs than are timed-gait or muscle performance tests. The KELS has particular strengths for evaluating impairment in the context of geriatric self-neglect because it assesses physical, cognitive, and executive functioning across five domains of independent living (Kohlman-Thomson, 1992). Furthermore, unlike many functional status tests that rely on self-report, the KELS also includes observation- and performance-based measurements. These findings suggest that safe and independent living in the community may be based on the adequacy of executive function for the performance of instrumental ADLs.

There are several limitations to the study results. The ideal relationship between a geriatric syndrome and functional decline should be independent and causal. The current study did find an independent association, but our study design cannot distinguish whether self-neglect is the cause or effect of functional impairment. Future longitudinal studies of older adults with self-neglect are needed. Second, participation in the SN group was based on referral to and evaluation by APS, which does introduce some detection bias for functional impairment.

**Table 2. Relationship of SN Group Status and Measurements on Physical Performance and Functional Status Instruments**

Instruments	SN Group	CC Group	p
	M (SD)	M (SD)	
Shoulder abduction (lb)	7.4 ± 4.2	6.8 ± 4.3	.44
Knee extension (lb)	6.2 ± 3.3	6.1 ± 3.4	.79
8-foot walk test (s)	6.7 ± 5.1	6.2 ± 5.5	.513
mPPT (range 0–24)	14.53 ± 5.2	15.93 ± 5.6	.077
KELS (range 0–16)	5.9 ± 2.7	4.3 ± 2.2	<.001

Note: SN group = self-neglect referral group; CC group = community-living control group; mPPT = modified Physical Performance Test; KELS = Kohlman Evaluation of Living Skills; SD = standard deviation.

Nevertheless, the baseline characteristics and performance on functional tests of the CC group describe a comparison cohort that is both frail and at risk for functional decline as based on established prognostic data (Covinsky, Hilton, Lindquist, & Dudley, 2006; Gill, Richardson, & Tinetti, 1995). Furthermore, our case definition of self-neglect was based on APS verification using criteria derived from Texas State statutes, which may limit the external validity of our results. In addition, over 20 participants in each group did not complete each of muscle or timed-gait tests. However, these missing data were evenly distributed between the two study groups and results from the KELS were missing for fewer than 10 participants overall.

### Practice Implications

Self-neglect has often been regarded as a personal preference or behavioral idiosyncrasy that becomes more apparent in older age. The findings of the current study, building on other recent evidence (Dyer et al., 2000; Lachs et al., 1998; Smith et al., 2006), suggest that self-neglect is epidemiologically a geriatric syndrome and should be regarded as a clinical red flag. When evaluating and diagnosing vulnerable older adults, clinicians and social services professionals must be aware of the limitations of functional assessment tools. Assessments that rely exclusively on muscle or performance testing may be inadequate. The KELS is an especially useful assessment tool because it identifies specific functional impairments that constitute the patient's overall vulnerability and provides insights regarding the patient's ability to implement potential interventions. Intervention strategies can then be tailored to functional and ADL impairments as well as the remediation of coincident morbidities and geriatric syndromes. Without a validated assessment method using multimodal techniques, judgments regarding one's ability to live safely and independently in the community are circumspect.

These findings raise questions about the assessment methods used in many legal jurisdictions to

**Table 3. Significance of Self-Neglect Referral With Measurements From Two Functional Status Instruments Using ANCOVA Models**

ANCOVA Models	% Variance (p)	
	mPPT (n = 187)	KELS (n = 197)
Model 1: Sociodemographics	.082 (.495)	.253 (<.001)
Model 2: Social support	.018 (.174)	.153 (<.001)
Model 3: Health status	.212 (.448)	.342 (.001)
Model 4: Composite	.221 (.496)	
Model 5: Composite		.320 (.001)

Note: The models encompass the following: Model 1, age, race, gender, education level, and monthly income; Model 2, marital status, living alone, and religious participation; Model 3, number of chronic conditions, number of medications, self-rated health, MMSE score, and short-form GDS score; Model 4, age, income, living alone, self-rated health, number of chronic conditions, and MMSE score; Model 5, age, income, gender, marital status, living alone, GDS score, and MMSE score. ANCOVA = analysis of covariance; mPPT = modified Physical Performance Test; KELS = Kohlman Evaluation of Living Skills; MMSE = Mini-Mental State Examination; GDS = Geriatric Depression Scale; % Variance = percentage of variance explained by self-neglect status as measured by adjusted R<sup>2</sup> when all covariates within each model are accounted for.

define self-neglect and the criteria for guardianship. Given the public health significance of this condition, future research must focus on standardizing the clinical diagnostic criteria and the definitions used by community and governmental organizations such as APS. Strategies to ameliorate self-neglect and other forms of elder mistreatment will require comprehensive approaches involving clinical and social services as well as governmental organizations. The findings of this study provide further evidence for the epidemiological and public health consequences of self-neglect in vulnerable older adults, and they offer support for future collaborations between clinical researchers and public health advocates.

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Received May 11, 2007  
 Accepted July 31, 2007  
 Decision: William J. McAuley, PhD

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