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Physical Independence: Examining Older Adults' Perceptions of Physical Limitations

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President
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Abstract

This investigation examined older adults' perceptions of physical limitations in comparison to their actual physical performance. Fifty independently living older adults (65-91 years) were interviewed to participate in the study. Their perception of physical limitation was measured through the use of a questionnaire. Participants' perception scores were categorized as physically "independent" or "moderately dependent". Perception data were compared with actual physical performance measures assessed by the Timed-Up-and-Go test (TUG). Age and gender-specific normative standards were utilized to classify the study participants as performing "above average/ normal" function or "below average/at risk" for loss of functional mobility. Health history was also obtained and used to determine the number, types and severity of medical conditions among individual participants.

A one-way ANOVA revealed significantly faster ($p<.05$) TUG completion times for older adults who were classified as independent and had fewer and less severe medical conditions. Sixty percent (n=30) of the participants were classified as moderately dependent even though they lived freely. Interestingly, 15 of 20 (75%) individuals who reported they were "independent" scored below normal or at risk for loss of functional mobility on the TUG. Only four individuals perceived themselves to be more physically dependent than test scores indicated.

Results indicate adults who report physical limitations due to health actually exhibited limitations in physical performance rather than being limited by a perception of such. Additionally, our sample revealed a physically

independent segment of the population that exhibits limitations in functional performance. Future studies should investigate the underlying factors that would cause this outcome.

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INTRODUCTION

As a person ages, there is generally a decrease daily cumulative physical activity. This decrease in activity could be due to physical, social, emotional, or environmental barriers (Satariano & McAuley, 2003). Older adults may report physical limitations based on their physicians' recommendations or self-diagnosis. With respect to the natural decline of health typical with aging, certain medical conditions can limit the amount of physical activity an older adult can perform. These limitations contribute to the decline in activity. Approximately one-half of older adults report disability or muscle discomfort as a reason for not participating in physical activity (Nied & Franklin, 2002). Some older adults with cardiac, pulmonary or rheumatologic conditions are advised by their physicians to exhibit caution when being physically active (Phillips, Schneider & Mercer, 2004). This advice is often interpreted as a recommendation to not engage in physical activity. Anecdotally, some families promote physical inactivity among older relatives and friends by removing routine tasks or by assisting them in daily tasks that they are very well capable of performing for themselves.

Older adults, their families, and medical professionals can underestimate the functional abilities of the elderly. An older adult's level of confidence and sense of control over their health are the strongest predictors of physical functioning (Phillips et al., 2004). It is therefore plausible that perceived physical limitations which may or may not actually be present could influence physical performance.

his study examined the extent to which older adults rated themselves as being physically limited in performing tasks, yet performed at or above normal on a task of physical performance. Further, the relationship between the older adult's self-report of physical limitations and the number and type of self-reported medical conditions was evaluated.

METHODS

Participants

The participants for this study consisted of 50 adults aged 65 years and over, self-selected and recommended by previous participants from local senior activity and nutrition sites. For inclusion, participants had to live independently and not be currently involved in any lifestyle intervention trials. The testing sites included in this study did not exclude participants based on economic status, race, gender or religious affiliation. The sites all had the common goal of aiding seniors in maintaining an independent lifestyle through education and various social and physical activities.

All subjects gave written informed consent prior to beginning the study. Partial funding allowed provision of a $10 gift card as an incentive for volunteers who completed the study.

The mean age of the participants was 75 years (range, 65-91 years). There were 44 females and 6 males (12%) with a mean body mass index of 29.6 (SD ± 6). Forty-four percent of the study participants were of African-American descent. Of the African-American participants, 86% were female. Since the questionnaires presented in the study asked the respondents to provide historical data, the Mini-Mental State Exam (MMSE) was administered to assess cognition. Of the sample, 80% had no apparent cognitive disorders (MMSE ≥24 out of max 30, (Samson, Meeuwsen, Crowe, Dessens and Dessens, 2000). The mean MMSE score was 25.8± 3.9 units. We did not exclude those participants with lower scores based on Samson et al. (2000).

Questionnaires

All survey data were collected from participants during one general session at the community site or participant's home. Participants were asked to respond to two separate questionnaires: a health history questionnaire (HHQ) modified from Hovda (2002) and a lifestyle information form (LIF) modified from Petrella, Miller, and Cress (2004).

The items on the HHQ were summed to obtain a total health history score. The response items received a score of 3 (6-months), 2 (1-year), 1 (Never) or 0 (Don't know) based on their response regarding whether they had experienced or been told by a physician that they had any of the named conditions within the response time frame. A higher score represented the participant having more recent medical conditions. If a respondent indicated that they experienced a medical condition more than one year ago, it was noted on the questionnaire and scored as the individual 'never' having the condition (1) for HHQ composite scoring. It was however, calculated in the total number of medical conditions the individual reported (TMC).

The LIF (20-item) questionnaire is adapted from the SF-36PF (10-item questionnaire) which is a validated measure assessing health-related limitations in various physical activities ranging from vigorous to basic (Petrella et al., 2004). The LIF responses were summated to obtain a physical functioning score. The response items were scored as 0, 2.5 or 5 for "yes, limited a lot", "yes, limited a little" or "no, not limited at all", respectively. A LIF score of <85 is associated with a transition to disability (Petrella et al., 2004).

Questionnaires were assigned codes in order to maintain the anonymity of the participants. The LIF questionnaire was administered first in order to eliminate any bias or mindsets that may have been created by addressing diagnosed medical conditions first.

Physical Performance Test- The Timed Up-and-Go

The timed up and go (TUG) test is a measure of both gait velocity and functional ability and is often used as a predictor of physical performance in older adults (Rikli and Jones, 2001). Hovda (2002) suggests that this combination of a chair stand and walking test is a simple and useful way to measure gait, balance, and strength. He further adds that this physical

performance combination makes it highly unlikely that an older adult could perform well in one area yet poorly in another.

The participant, utilizing an adjustable, backless chair without arms, stood from a seated position, 43.2 cm (17-inches), walked a distance of eight feet, turned around 180 degrees, walked back to the chair and sat down (initial trial). This procedure was repeated two additional times after a two-minute rest. Task completion times were recorded to the nearest 0.01 second. The best time to completion was used for data analysis (Rikli and Jones, 2001).

Data Analysis

Data from the Health History Questionnaire (HHQ) and the Lifestyle Information Form (LIF) were each summated. The number of medical conditions each participant reported on the HHQ was categorized into types of medical conditions and transformed into two groups based on their relative risk for participating in physical activity: severe or low/moderate. HHQ medical conditions that were considered high risk according to the American College of Sports Medicine and American Heart Association risk stratification criteria (ACSM, 2005) were classified as severe. All other medical conditions were classified as low/moderate risk. LIF scores were categorized to reflect the level of physical limitations, independent (LIF score $\geq$85) or moderately dependent (LIF score, <85) of the participants (Petrella et al., 2004).

Participants were also categorized by age and gender in order to compare TUG scores with normative standards (Rikli and Jones, 2001). When compared with norms, participants could be further classified as above average/normal (AAN) or below average/at risk for loss of functional mobility (BAR) based on their TUG performance.

SPSS for Windows (14.0, Chicago, IL) was used to analyze all data. Pearson product correlations were determined for comparison between all test variables (HHQ, LIF and TUG). A one-way analysis of variance (ANOVA) was conducted to evaluate TUG outcomes among the two LIF groups.

Functional performance, i.e. above average/normal (AAN) and below average/at risk for loss of functional mobility (BAR) was compared with independence level, i.e. independent (IND) and moderately dependent (MDEP), utilizing crosstab analysis. This was done to see if there were any older adults who were classified as MDEP but were AAN in functional performance. Further comparisons were done between MDEP/AAN and MDEP/BAR participants to determine if the number and type of medical conditions they reported differed between the two groups.

This work was supported by The University of Alabama and the College of Education.

RESULTS

Descriptive

Table 1 illustrates the participant characteristics grouped by independence level. The majority of the participants were between the ages of 65 to 69 years of age (30%, n=15) and 75 to 79 years of age (32%, n=16). Based on the LIF stratification, 20 participants were classified as independent (IND) and 30 participants were classified as moderately dependent (MDEP).

Table 1. Participant characteristics grouped by LIF cohort

Characteristic	Independent (LIF ≥ 85) n=20	Moderately Dependent (LIF < 85) n= 30
Demographics		
Age, mean ± SD	74.8 ± 5.8	74.7 ± 7.7
BMI, kg/m2, mean ± SD	27.1 ± 4.5	31.2 ± 6.5
Physical Performance, seconds, mean ± SD		
TUG 17†	8.30 ± 1.9†	12.58 ± 9.3† (n =28)
Total Medical Conditions, mean ± SD	1.5 ± 2.1†	5.7 ± 3.4†
Type of Medical Conditions*		
Severe Conditions, mean ± SD*	0.4 ± 1.4	2.2 ± 1.7
Leg pain when walking	0	14
Unusual fatigue	1	13
Shortness of breath at rest	1	10
Angina	1	6
Heart failure	0	2
Heart block	0	3
Chronic bronchitis	2	4
Chronic obstructive pulmonary disease	1	0
Asthma	1	11
Emphysema	1	2
Moderate/Low Conditions, mean ± SD	1.1 ± 1.4	3.6 ± 2.6
Mini-Stroke	1	2
Circulation Legs/Feet	1	12
Arthritis Feet	1	12
Arthritis Back	3	11
Arthritis Knee	5	18
Arthritis Hips	1	8
Irregular heartbeat	2	10
Heart valve problem	1	2
Circulation Head/Neck	1	5
Circulation Other Area	0	2
Arthritis Hands	3	16
Arthritis Shoulders	2	10

* Number displayed is the number of conditions reported for each group. TUG= Timed up-and-go test. † Statistically significant at $\alpha = .05$.

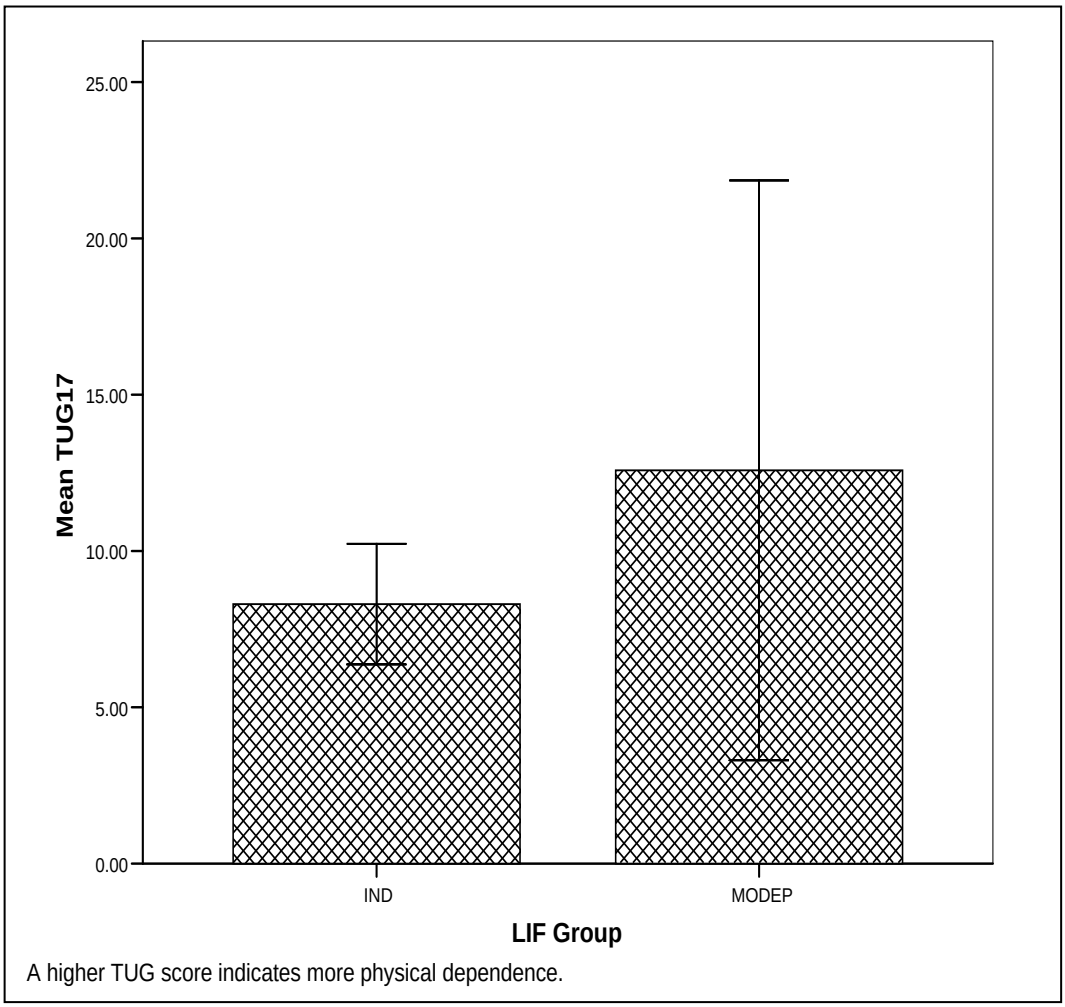
Health History (HHQ), Physical Independence (LIF) and Physical Performance (TUG)

Pearson product correlations were used to analyze the relationship between the testing variables LIF and HHQ. Composite scores for the HHQ were found to correspond with composite LIF scores (r = -.46, p<.05), LIF groups (r = .48, p<.05) (i.e. IND or MDEP) and TUG performance (r= .31, p<.05). LIF also had a significant inverse relationship with TUG performance (r = -.53, p<.01).

There were statistically significant relationships found between the total number of medical conditions (r = -.62, p<.01), the total number of severe conditions (r = -.53, p<.01) and the total number of moderate/low conditions (r = -.51, p<.01) the older adult possessed and their level of independence based on the LIF score.

A one-way analysis of variance (ANOVA) was conducted to compare mean TUG completion times between the IND and MDEP groups. There was a significant difference in TUG completion times among IND and MDEP participants (F (1,46)=4.108, p < .05). The IND participants had faster completion times (8.30 ± 1.93 s) when compared to MDEP participants (12.58 ± 9.27 s) (Figure 1).

Figure 1. Mean TUG completion times +/- (1) Standard Deviation by LIF cohort.



Participant's TUG scores were compared with age and gender specific norms and then grouped based on how they rated in performance; above average/normal (AAN) or below average/at risk for loss of functional mobility (BAR). Cross tabulations were utilized to compare TUG norms (AAN/ BAR) with LIF cohorts (IND/MDEP) to test our hypothesis that there are some older adults who are able to do more physically despite self-reported limitations. Table 2 illustrates the matrix as a result of the TUG/ LIF cross tabulations. Eighty-seven percent (n=26) of older adults who reported physical limitations were actually limited in their physical performance ability. However, it should be noted that only nine (18%) individuals performed at or above normal on the TUG. Also, it should be noted that 15 of 20 (75%) individuals who reported they were IND scored below normal or at risk for loss of functional mobility on the TUG.

Quadrant means of HHQ composite scores, number of medications (TMC) and type of medical condition (i.e. severe or moderate/low) were compared to help explain TUG/LIF cross tabulation results (Table 3). There

were only four individuals in the MDEP/AAN quadrant. However, this group did report lower mean values for HHQ, TMC and the type of medical conditions reported compared to those in the MDEP/BAR quadrant.

Table 2. Crosstabulations of LIF and TUG cohort

			TUG Cohort		
			AAN	BAR	Total
LIF Cohort	IND	Count	5	15	20
		Expected Count	3.6	16.4	20.0
		% within LIFDEP	25.0% *Quadrant 1*	75.0% *Quadrant 2*	100.0%
	MDEP	Count	4	26	30
		Expected Count	5.4	24.6	30.0
		% within LIFDEP	13.3% *Quadrant 3*	86.7% *Quadrant 4*	100.0%
Total		Count	9	41	50
		Expected Count	9.0	41.0	50.0
		% within LIFDEP	18.0%	82.0%	100.0%

IND= independent, MDEP= moderately dependent, AAN= above average/normal, BAR= below average/ at risk for loss of functional mobility.

DISCUSSION

The purpose of this study was to determine the extent to which older individuals perceived themselves as being physically limited in performing tasks, yet performed at or above normal on a task of physical performance. We further considered whether the number and type of self-reported medical conditions helped to clarify this relationship.

The main findings of this study were: i) those adults who generally report physical limitations due to health do exhibit limitations in physical

performance; ii) and furthermore, their limitations could partially be explained by the number (r = -.62, p< .01) and type of medical conditions (severe, r = -.53, p<.01; moderate/low, r = -.51, p<.01) an older adult self-reports.

We expected this study to identify more individuals who rated themselves as being physically limited, yet performed at or above normal on a task of physical performance (MDEP/AAN quadrant). However, when comparing these individuals with those who did rate themselves as being physically limited and their physical performance test indicated such (MDEP/BAR), the MDEP/AAN quadrant had test variable means which were lower than those of the MEDP/BAR quadrant (Table 3). This substantiated those individuals being classified as independent (IND).

Table 3. Comparison of means (HHQ, Medical Conditions, and Type) grouped by quadrant

Quadrants		HHQ	TMC	Severe	Mod_Low
IND/AAN	N	5	5	5	5
Quadrant 1	Mean	23.80	.80	.20	.60
	Std. Deviation	1.79	.84	.45	.55
IND/BAR	N	15	15	15	15
Quadrant 2	Mean	24.67	1.67	.47	1.20
	Std. Deviation	4.19	2.32	1.55	1.57
MDEP/AAN	N	4	4	4	4
Quadrant 3	Mean	26.00	2.50	1.00	1.50
	Std. Deviation	1.41	1.29	.82	.58
MDEP/BAR	N	26	26	26	26
Quadrant 4	Mean	31.88	6.23	2.35	3.88
	Std. Deviation	7.54	3.34	1.70	2.70
Total	N	50	50	50	50
	Mean	28.44	4.02	1.46	2.56
	Std. Deviation	6.91	3.59	1.76	2.54

IND= independent, MDEP= moderately dependent, AAN= above average/normal, BAR= below average/ at risk for loss of functional mobility, HHQ= health history questionnaire, TMC= number of total medical conditions reported, Severe= total number severe medical conditions, Mod_Low= total number moderate/low medical conditions.

Conversely, these analyses revealed there was a group of older adults who reported not being limited physically due to their health, but performed poorly on the physical performance test. This group of older adults was considered below normal or at risk for loss of functional mobility (Table 2, Quadrant 2). When trying to determine if the number and severity of medical conditions influenced this group of older adults' physical performance outcomes, compared to those independent adults who actually performed at or above

normal (Quadrant 1), the mean number of and type of medical conditions were lower across test variables (Table 3).

It is interesting to note that our post hoc analysis of gender and independence found that all six of the men in our study (100%), were in the IND/BAR quadrant. Simply stated, they were not able to perform physically as well as they perceived. Morey and Zhu (2003) noted women more often than men report greater functional decline and have more disabling chronic conditions. Our findings are also consistent with Merrill, Seeman, Kasl, and Berkman (1997) who found women were more likely to over report their physical limitations. These findings suggest that the differences in self-reporting physical limitations among gender may partially explain the observed differences in quadrant outcomes based on physical limitations.

In this study the LIF instrument demonstrated low sensitivity in identifying those older adults who we expected not to perform well on the physical performance measures. There were 15 individuals who reported not being limited but, their performance test showed otherwise (Table 2). Conversely, there were 26 individuals who reported being physically limited and whose TUG test supported this notion.

To conclude, this study explored the impact of self-reported health history and physical limitations on physical performance among older adults. We hypothesized that some older adults would be able to do more than they deemed themselves capable of doing physically. After comparing physical performance test with self-reported data, we concluded that the majority of older adults who self-report physical limitations are actually physically limited. However, it should be appreciated that only nine older individuals (18%) were classified as above average/ normal by the physical performance test. Additionally, our sample revealed another segment of the population who is classified as independent but performs as if they are physically limited. Future studies should investigate the underlying factors that would contribute to this outcome.

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