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Muscle Weakness and Physical Disability in Older Americans: Longitudinal Findings from the U.S. Health and Retirement Study

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Abstract

Importance: Muscle weakness is an important indicator of disability, chronic disease and mortality. While we recently proposed sex/race specific grip strength cutpoints for clinical muscle weakness in a diverse, nationally representative sample of older Americans, the extent to which these cutpoints predict physical disability remains unknown.

Objective: To examine whether sex/race specific muscle weakness cutpoints predict physical disability status in a nationally representative sample of Americans age 65+.

Design: We used data from the 2006–2010 Health and Retirement Study. Fully-adjusted, weighted multinomial logistic regression models were used to quantify the odds of experiencing the onset, progression or persistence of disability in activities of daily living (ADL) among weak versus non-weak individuals over a 2-year period.

Setting: General community, nationally representative sample of older Americans

Participants: Population-based, community dwelling sample of older American adults aged 65-years+; 57 percent were women, 91% were White and the mean age was 75 years.

Main Outcome(s) and Measure(s): The primary outcome of interest was disability dynamics, defined by changes in ADL status across at 2- year period. The primary exposure was clinical muscle weakness as defined by previously identified cutpoints. Hypotheses were formulated before analyses were conducted.

Results: In this nationally representative sample (n= 8,725), 44% of individuals were classified as weak at baseline. At follow-up, 55% remained independent with no change in their ADL status, 11% had an onset of disability and 4% progressed in their disability status. The odds of experiencing an onset of ADL disability was 54% higher among weak individuals compared those who were not weak at baseline (OR= 1.54, 95% CI= 1.54, 1.5, p<.0001); the odds of experiencing a progression in physical disability status was 2.16 times higher among those who were weak at baseline compared to non-weak individuals (OR= 2.16, 95% CI= 2.15, 2.16, p<.0001).

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Ethnical Standards Declaration: The research presented in this manuscript complies with the current laws of the United States.

Conclusions: This is the first study to use grip strength weakness cut-points to identify those who may be at greatest risk for experiencing physical disability in later life. Results underscore the importance of using population-specific cutpoints for clinical weakness in order to identify individuals at greatest risk for adverse health outcomes.

Keywords

dynapenia; ADLs; muscle weakness; disability

Introduction

Muscle weakness is a primary determinant of age-related loss of function, [1,2] and is associated with mobility disability, [3–5] cardiovascular disease[6] and early mortality.[6,7] Hand grip strength has been shown to be a reliable and cost-effective surrogate of overall muscle strength[8,9] and is a robust prognostic indicator of subsequent functional limitations[3,5] and future disease status[10]. While age-related losses in muscle strength and mass are a natural part of the aging process, individuals who undergo steeper declines in muscle strength may be more vulnerable to changes in physical disability status in later life. [11–13]

Despite a well-documented literature linking muscle weakness to disability[12–15] and a host of other negative health outcomes,[10,16,17] an ongoing debate remains regarding how best to define muscle weakness in a clinical setting. Recent efforts to define clinical muscle weakness proposed by the Foundation for the National Institutes of Health were derived using non-nationally representative, pooled data that do not reflect the growing racial and ethnic diversity in the U.S. population.[18] As a result, we recently established cutpoints for clinical muscle weakness (Table 1) in a nationally-representative, racially-diverse cross-sectional sample of Americans aged 65 years and older.[19] and found a higher prevalence, where 55% of men (max grip strength <39kg) and 47% of women (max grip strength <22kg) were clinically weak. In addition, we identified stark race/ethnicity disparities, with 57% of Black men (<40kg) and 88% of Black women (<31kg) were considered to have clinical muscle weakness compared to 37% and 48% of White men and women, respectively. While these data represent an important step forward in defining muscle weakness at the population level, it is still not known whether these cutpoints can be used to predict subsequent changes in disability status over time. Understanding disability dynamics is an important health outcome that has significant implications for the rapidly aging US older adult population.

Therefore, in order to address these gaps, the primary objectives of this study were to examine the predictive ability of the population-based cutpoints for clinical muscle weakness, and to quantify the association between baseline muscle weakness and the onset, progression and persistence of physical disability in a nationally-representative sample of older Americans during a 2-year time period. We hypothesize that older adults that are strong at baseline, as identified by previously defined sex/race specific cutpoints, will be at reduced odds of experiencing onset, progression and persistence of disability and more likely to improve across a 2-year time period, compared to weak individuals.

Methods

Design and Sample Population

Data come from the Health and Retirement Study (HRS), a nationally-representative, multistage area probability survey of non-institutionalized, community dwelling Americans aged 51 years and older. Study details have been previously described [26]. HRS is the longest running longitudinal study of older Americans in the United States, with consistent response rates of ~85%.[26] Sampled persons have been re-interviewed biannually since 1992, and new cohorts have been added to the original sample to maintain the nationally-representative nature of the survey over time.[26] Ongoing surveillance via the National Death Index provide continuous mortality status, including date of death, for all participants.

In 2006, half the sample of HRS participants was randomly selected for an enhanced face-to-face interview that included physical measurements (gait speed for those 65+ and hand grip strength), and the other random one-half completed the same interview in 2008.[27] The 2006 and 2008 random sub-samples were then combined to yield the full, eligible baseline sample. Proxy interviews and nursing home residents were ineligible to participate.

Individuals who made up the 2006 (n= 5,809) and 2008 (n= 5,542) HRS waves were combined to yield a full baseline sample of 11,351 eligible individuals. We subsequently excluded individuals who were less 65 years of age (n=7,832), identified as “other” race (n=393), and those who required a proxy interview or were in a nursing home at the time of the interview (n=2,167). After applying these exclusion criteria, our final analytic sample was composed of 8,725 individuals. Two-year follow-up data were included for all individuals from 2008 and 2010.

Measures

Hand grip strength—Hand grip strength was assessed using a Smedley spring-type hand dynamometer (Scandidact, Denmark). Participants were instructed to squeeze the device with the dominant hand as hard as they could, and then let go. Grip strength assessments were administered while participants were standing with their arm at their side, and with the elbow flexed at a 90 degree angle.[27] After one practice trial, two measurements were taken with each hand, alternating hands. The maximum measurement from the four trials was used for the analysis. HRS sub-group specific cutpoints for clinical weakness were then applied to identify those who were weak versus not weak at baseline[19]. The cutpoints are summarized in Table 1.

Physical Disability—Physical disability was assessed using self-reported difficulty with six self-care activities of daily living (ADLs): eating, bathing, dressing, transferring, toileting and walking across a room.[28] For each activity, difficulty was recorded as present (i.e., difficulty with activity or cannot/does not do) or absent (no difficulty). An ADL summary score was computed for each individual based on the sum of all reported difficulties across all 6 activities. For example, if an individual reported 3 ADL difficulties, then they received an ADL summary score of 3. Two ADL summary scores were calculated

for each individual—one at baseline (2006/2008) and then at follow-up 2 years later (2008/2010).

In order to assess changes in physical disability status across the 2-year period, an ADL change score was calculated as the difference between the ADL summary score at follow-up and baseline. After creating the ADL change score for each person, a 6-level outcome variable was created based on the six types of change observed across the entire sample: (1) "No Disability, No Change", no ADL difficulties reported at both baseline and follow-up; (2) "Persistent disability", individuals reporting the same number of ADL difficulties at baseline and at follow-up; (3) "Onset", individuals who reported no ADL difficulties at baseline and at least one or more ADL difficulties at follow-up; (4) "Progression", one ADL difficulty at baseline and more than one ADL difficulty at follow-up, (5) "Improvement", individuals who reported at least one ADL difficulty at baseline and at least one fewer ADL difficulty at follow-up; and (6) "Lost to follow-up", individuals who received an ADL score at baseline but were lost to follow-up (including mortality) 2 years later. This last group (n=938) was included in order to account for missingness and to avoid biasing the analysis, which could occur if these individuals were excluded. The "No Disability, No Change" group served as the reference group in the analysis since this group had the best outcome and the highest level of functioning.

Covariates—The following relevant baseline covariates were included in our model: age (continuous), sex, self-reported race/ethnicity, education (3-level categorical variable, less than a high school degree, high school degree, some college/college degree), number of chronic conditions (continuous summary measure, based on 8 self-reported medically diagnosed chronic health condition: high blood pressure, diabetes, cancer, lung disease, heart disease, stroke, psychiatric problems and arthritis), body mass index (BMI) ((measured weight in kilograms/ (measured height in meters)^2), and gait speed (continuous measure, assessed using a 8-foot long timed walking test administered by trained raters in participants' homes over).[27]

Statistical Analysis—All statistical analyses were conducted using SAS software 9.3 (Cary, NC).[29] Bivariate differences between individuals who were weak versus non-weak were assessed using t-tests for continuous variables and chi-squared tests for categorical variables. Descriptive analyses were weighted using HRS sampling weights and statistical significance was assessed with a two-tailed alpha of 0.05. Fully-adjusted models (including age, sex, self-reported race/ethnicity, education, number of chronic conditions, BMI, and gait speed), weighted multinomial logistic regression models were used to quantify the odds of experiencing an onset or progression in ADL disability status among weak versus non-weak individuals, over a 2-year period. Interactions by sex were also examined with a 2-level interaction term in the fully-adjusted model.

Results

The age, sex and race breakdown of our sample is consistent with that of Americans aged 65 years and older based on U.S. census data.[28] Table 2 presents the weighted socio-demographic characteristics for all study participants. Fifty-seven percent were women, 91%

were White, and the mean age was 75 years. Forty-four percent of individuals were identified as weak based on the previously identified sub-group specific cutpoints. There was a high prevalence of slow walking speed (<0.8 meters/second) with 60 percent of individuals classified as slow. At baseline, 80% of individuals had no difficulty with any ADLs. Over the 2-year follow up period the majority of the sample (55%) remained independent with no change in their ADL status, 11% had an onset of disability and 4% progressed in their disability status. Six percent of the sample improved and 21% of individuals were lost to follow up (678 individuals died and 265 were lost due to sample attrition (i.e., unable to locate, refusals) across the 2-year follow-up window). Table 3 presents the results from the adjusted multinomial logistic regression, which assessed the odds of experiencing a change in physical disability status across the 2-year follow-up period (2008/2010) compared to the "No Disability, No Change" reference group.

Disability Onset Versus No Disability, No Change

Compared to the "No Disability, No Change" reference group, the odds of experiencing an onset of physical disability was higher among weak individuals compared to non-weak individuals (OR= 1.54, 95% CI= 1.54, 1.55) (Model A, Table 3). Females were at greater odds of experiencing disability onset (OR= 1.04, 95% CI= 1.04, 1.05) compared to males. Individuals with less than a high school degree (OR= 1.17, 95% CI= 1.16, 1.17) or had only a high school degree (OR= 1.50, 95% CI= 1.50, 1.51) were at greater odds of disability onset compared to individuals with some college or a college degree. Blacks were at greater odds of disability onset compared to Whites across the two-year period (OR=1.12, 95% CI= 1.11, 1.12), net of covariates.

Disability Progression versus No Disability, No Change

Compared to the "No Disability, No Change" reference group, the odds of experiencing a progression in physical disability were substantially higher among those who were weak at baseline compared to non-weak individuals (OR= 2.14, 95% CI= 2.13, 2.15) (Model B, Table 3). Individuals with less than a high school degree were at greater odds (OR= 1.45, 95% CI= 1.44, 1.45) of disability progression compared to those with some college or a college degree. For each additional chronic condition, individuals had over a 50% higher odds of experiencing a progression in their disability status (OR= 1.58, 95% CI= 1.58, 1.58). Blacks were also at greater odds of experiencing a progression in their disability status compared to Whites across the two-year period (OR=1.06, 95% CI= 1.05, 1.06).

Persistent Disability versus No Disability, No Change

Weak individuals had almost a two-fold higher odds (OR= 1.90, 95% CI= 1.89, 1.91) of experiencing persistent disability across the 2-year period compared to non-weak individuals (Model C, Table 3). Blacks were at greater odds (OR= 1.18, 95% CI= 1.18, 1.19) of persistent disability compared to Whites. Individuals who had less than a high school degree had 18% increased odds of persistent disability compared to their college-educated counterparts. For each additional chronic condition, the odds of persistent disability increased by almost 50% (OR= 1.49, 95% CI= 1.49, 1.49). Older age, slower walking speed and higher body mass index were also associated with remaining persistently disabled over the observation period (all $p<0.01$).

Improved versus No Disability, No Change

Compared to the “No Disability, No Change” group, the odds of experiencing an improvement in physical disability was 63% more likely for weak versus non-weak individuals (OR=1.63, 95% CI= 1.63, 1.64) (Model D, Table 3).

Sex by Weakness Interaction

In examining whether the association of muscle weakness and disability status differed by sex, we found that muscle weakness was strongly associated with disability status for both groups; however, the magnitude of this association was stronger for men compared to women. Specifically, among men, compared to the “No Disability, No Change” group, the odds of experiencing disability onset was 71% more likely for weak men compared to non-weak men (OR= 1.71, 95% CI= 1.71, 1.72); the odds of experiencing disability progression was 3.16 times more likely for weak men compared to non-weak men (OR= 3.16, 95% CI= 3.15, 3.18); and, the odds of experiencing disability recovery was 2.19 times more likely for weak men compared to non-weak men (OR= 2.19, 95% CI= 2.19, 2.20) across the 2-year period.

Among women, compared to the “No Disability, No Change” group, the odds of experiencing disability onset was 38% more likely for weak versus non-weak women (OR= 1.38, 95% CI= 1.37, 1.38); the odds of experiencing disability progression was 70% more likely for weak versus non-weak women (OR= 1.70, 95% CI= 1.69, 1.70); and, the odds of experiencing disability recovery was 38% more likely for weak versus non-weak women (OR= 1.38, 95% CI= 1.37, 1.38) across the 2-year period.

Discussion

To the best of our knowledge, this is the first nationally-representative study to examine the pace of disability onset, progression and persistence in relation to muscle weakness in older Americans. Consistent with existing work,[12,13,15,22] the results of this study indicate that older adults with clinical muscle weakness, as identified by sex/race specific population-derived cutpoints,[19] are at significantly increased risk of experiencing a deterioration in their ability to engage in basic self-care activities of daily living across a two year time period. Specifically, we found that clinical muscle weakness is strongly associated with the onset, progression and persistence of physical disability status, highlighting the importance of screening efforts to identify those who are most vulnerable to the consequences of clinical muscle weakness as they age.

The results of this study bolster the existing literature by using population-derived cutpoints for clinical weakness to demonstrate the consequences of muscle weakness for multiple patterns of change in physical functioning among older adults over time. Previous work that has sought to measure and define clinical muscle weakness has derived cutpoints from sample-specific distributions,[1] and relied on non-representative reference populations,[3,30] or non-nationally representative, pooled data sources to establish definitions for weakness,[18] all of which may not be generalizable at the population level for identifying and treating clinical weakness. Additionally, by examining the development of disability onset, progression and

persistence of disability, the results of this study indicate that muscle weakness may in fact influence the *pace* of disability. This has important health implications for older adults since previous research has shown that disability onset and progression are associated with increased risk of hospitalization,[31] institutionalization,[32] and mortality.[33] Prior work examining the association between muscle weakness and disability have typically relied on binary definitions of disability status (presence/absence),[13,34] which may underestimate the weakness-disability association at the population level since disability has been shown to fluctuate over time.[34–37]

Nonetheless, our results are consistent with others that have examined the link between muscle weakness and ADL disability and physical functioning. Rantanen et al. found that low hand grip strength among 45–68 year olds was strongly associated with disability status 25 years later.[5] Using HRS data, Germain et al. found that tertile-specific low muscle strength was associated with higher odds of physical and functional outcomes, although those analyses were cross-sectional.[38] In a 3-year longitudinal study by Onder et al., higher handgrip strength was found to be protective against incident ADL disability.[39] Additionally, a 4-year longitudinal study found that higher handgrip strength was associated with a reduced risk in the development of new functional difficulties, although this analysis was restricted to the oldest old.[40]

We also found that the association between muscle weakness and disability was stronger for males than females across all levels of the disability outcome. While previous work investigating sex differences and disability status has found that females are more likely to be disabled in older age [41,42], our findings suggest that other contextual factors may play an important role in driving disability status among women. In our sample, we found that women had greater chronic disease impairment, less education, as well as lower maximum grip strength at baseline. Thus, the attenuated estimates observed for women may reflect a complex array of risk factors acquired across the life course that differentially impact the relationship between muscle weakness and disability status.

An unexpected finding was that weak individuals were more likely to improve across the 2-year time period compared to those who were not weak at baseline. While these results were unexpected, previous research has found that the probability of experiencing an improvement in physical functioning is inversely related to the severity of the disability.[43,44] In our study, 75% (n=324) of individuals who experienced an improvement in disability had only 1 ADL limitation at baseline, implying that the interventions needed to improve one's disability status may have been more attainable and/or accessible compared to individuals with greater disability severity (i.e., 3+ ADL limitations). Additionally, several studies have noted that disability trajectories are fluid and may change over time, especially when studied within a longitudinal design setting with closely measured, repeated time points.[43]

The term "intermittent disability" has been used in the literature to characterize individuals who report disability at one time point but not at subsequent follow up points, implying that gains made over short intervals may not be permanent. In a 5-year prospective cohort study of community-living older adults, Gill et al. (2006) found that the majority of participants experienced at least one episode of intermittent disability and that these episodes lasted, on

average, about 6 months.[37] In our study, we found that 75% (n=324) of the individuals who reported 1 ADL disability at baseline went on to report no ADL disability at follow-up. However, 42% (n=159) of these same individuals went on to report 1 or more ADL disability in the subsequent 2 years period (2010/2012). These results imply that while these individuals may have improved in the short-term that may have "relapsed" and become disabled two years later. Thus, intermittent disability episodes may partially explain the counterintuitive findings with respect to weakness in this study.

Strengths and Limitations

Our study is not without limitations. First, this analysis examined the association between weakness and disability across a two-year interval. It is possible that other competing events, such as acute hospitalization, could partially explain the observed weakness-disability association. Second, we were unable to control for underlying conditions (i.e., paresis, neuropathy, etc.) that may have led to changes in ones' disability status. Despite this limitation, we were able to account for baseline chronic disease status, which is an important indicator since multi-morbidity has been found to be associated with both disability and physical functioning.[45] Third, while research suggests that muscle strength may be an important risk factor in middle age [5], the cutpoints utilized in this study were derived in adults aged 65+ years. There is growing interest in the role grip strength may play as a mid-life biomarker of future physical functioning and disability since previous research has found that disability rates are increasing among middle-aged Americans.[46] Therefore, future research should focus on middle age as a potentially critical window for screening and intervention. Fourth, the primary outcome was assessed as self-reported difficulty in activities of daily living, which may have led to an underestimate of the true association if sicker individuals were less likely to report changes in their ADL status. Lastly, as in any longitudinal design setting, we had 10% attrition due to losses to follow-up. However, we accounted for those lost to follow-up in our multinomial ADL outcome variable, which reduced potential bias that would have occurred if we had excluded these individuals from our analysis.

Despite these limitations, this study has several notable strengths. First, we used handgrip strength as our primary exposure, which is a cost-effective, reliable proxy for total body muscle strength that can be easily administered in the clinical setting [47,48]. The results of this study imply that the grip strength cutpoints utilized in this study can be used for identifying those individuals most at risk for changes in disability status without involving invasive diagnostic tools or time-intensive screening questionnaires. Additionally, our findings provide support for the prognostic utility of the population-derived muscle weakness cutpoints used in this study, which has important implications since screening and intervention efforts cannot be fully realized until clinical and epidemiologic communities coalesce around standardized cutpoints to identify individuals who may be a greatest risk. Finally, our results provide support for tailoring interventions to each individual's unique dynamic disablity status in an effort to prevent steeper declines as individuals age.

Conclusions

This is the first study to use muscle weakness cut-points derived in a nationally-representative sample of older Americans to identify those who may be at greatest risk of experiencing onset, progression and persistence in their disability status in later life. Results underscore the importance of using population-specific cutpoints to identify individuals at greatest disability risk.

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Table 1:

Cutpoints for clinical muscle weakness by race/sex in the Health and Retirement Study.

	2006/2008 HRS Total Sample (N= 8,725)			
	White Males	**Black Males**	**White Women**	**Black Women**
	(n=3,279) Cutpoint (kg)	(n=422) Cutpoint (kg)	(n=4,286) Cutpoint (kg)	(n=738) Cutpoint (kg)
Weak	<35	<40	<22	<31
Normal	≥35	≥40	≥22	≥31

Table 2.

Demographic characteristics in weak and non-weak older adults, Health and Retirement Study, 2006/2008 (N= 8,725) *

	Weak (n= 3813)			Non-Weak (n= 4654)	
	Mean		*SD*	*Mean*	*SD*
Age (y)	77.3		*7.5*	72.3	*5.6*
Maximum Grip Strength (kg)	22.4	6.9	*10.4*	34.8	*9.5*
Gait Speed (meters/second)	0.69		*2.2*	0.86	*1.7*
	N **		*%* ***	*N* *	*%* **
Sex					
Male	1358		*36.5*	2295	*49.4*
Female	2455		*63.5*	2359	*50.3*
Race/Ethnicity					
White	2984		*86.5*	4381	*96.7*
Black	829		*13.5*	273	*3.3*
Activities of Daily Living (ADLs)					
0	2806		*70.9*	4160	*88.9*
1	497		*13.6*	304	*6.6*
2	217		*6.2*	107	*2.5*
3+	293		*9.2*	83	*1.9*
Slow Walking Speed					
Slow Walkers (<.8 m/s)	2883		*75.6*	2161	*45.8*
Normal Walkers (≥.8 m/s)	930		*24.4*	2493	*54.2*
Body Mass Index					
Underweight (<18.5)	99		*3.2*	40	*0.9*
Normal Weight (18.5–24.9)	1379		*38.5*	1267	*28.3*
Overweight (25–29.9)	1334		*35.1*	1901	*40.6*
Obese (≥30)	952		*23.3*	1403	*30.2*
Chronic Conditions					
No chronic conditions	204		*5.5*	463	*10.4*
At least one chronic condition	672		*17.6*	1117	*23.8*

	Weak (n= 3813)		Non-Weak (n= 4654)	
2+ more chronic conditions	2937	*77.0*	3073	*65.8*

* T-tests for continuous variables, X^2 for categorical variables; all are significant at the p<.0001 level

** Number of participants, unweighted

*** Percentage, weighted

Table 3:

Disability and Muscle weakness: Multinomial Logistic Regression Models For Disability Status*, Health and Retirement Study, 2006/08–2008/10

	A. Disability Onset vs. No Disability, No Change		B. Disability Progression vs. No Disability, No Change		C. Disability Persistence vs. No Disability, No Change		D. Disability Improvement vs. No Disability, No Change	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Variable								
Weak								
Non-Weak	Ref		Ref		Ref		Ref	
Weak	1.54	1.54, 1.55	2.14	2.13, 2.15	1.90	1.89, 1.91	1.64	1.63, 1.64
Sex								
Males	Ref		Ref		Ref		Ref	
Females	1.04	1.04, 1.05	0.99	0.99, 0.99	0.98	0.98, 0.98	1.30	1.30, 1.31
Race/Ethnicity								
Whites	Ref		Ref		Ref		Ref	
Blacks	1.12	1.11, 1.12	1.06	1.05, 1.06	1.18	1.18, 1.19	0.99	0.99, 1.00
Education								
Some College/College	Ref		Ref		Ref		Ref	
High school	1.50	1.5, 151	0.89	0.88, 0.89	1.02	1.01, 1.02	1.00	1.00, 1.01
Less than HS	1.17	1.16, 1.17	1.45	1.44, 1.45	1.18	1.18, 1.19	1.47	1.47, 1.48
Body Mass Index								
Underweight	Ref		Ref		Ref		Ref	
Normal weight	1.11	1.11, 1.12	0.50	0.50, 0.51	0.96	0.95, 0.97	0.33	0.32, 0.33
Overweight	1.08	1.07, 1.09	0.45	0.44, 0 .45	1.01	1.00, 1.03	0.40	0.39, 0.40
Obese	1.39	1.37, 1.39	1.11	1.10, 1.12	2.00	1.98, 2.03	0.67	0.66, 0.68
Chronic conditions	1.42	1.41, 1.42	1.58	1.58, 1.58	1.49	1.49, 1.49	1.54	1.53, 1.54
Age	1.06	1.05, 1.06	1.05	1.04, 1.05	1.05	1.05, 1.06	1.03	1.03, 1.03
Walking speed	1.21	1.2, 1.21	1.39	1.39, 1.39	1.31	1.3, 1.31	1.39	1.39, 1.39
	1.02	1.02, 1.02	1.07	1.06, 1.07	1.06	1.06, 1.06	1.05	1.05, 1.05

*Reference Group: No Disability, No Change