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Health-Related and Sociodemographic Correlates of Meeting the Muscle Strengthening Exercise Recommendations in Middle-Aged and Older Adults with and without Disabilities

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Health-related and sociodemographic correlates of meeting the muscle strengthening exercise recommendations in middle-aged and older adults with and without disabilities

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Abstract

Purpose: To identify sociodemographic and health correlates of meeting the muscle strengthening (MS) exercise recommendations in middle-aged and older adults by disability status.

Methods: Respondents from the 2011 Behavioral Risk Factor Surveillance System were stratified by disability status (with disability, without disability), age [ages 45-64 (middle-aged), 65+ years of age (older adults)] and by whether they met MS recommendations (yes, no). Two logistic regression models were run to evaluate whether perceived health status and sociodemographic characteristics were associated with meeting the MS recommendations by disability status.

Results: The sample included 477,662. Middle-aged persons were 20% more likely than older adults to meet the MS recommendations. Persons with a disability were less likely to meet muscle strengthening recommendations compared with those without. Persons with a disability who reported having poor health were ~65% less likely to meet the MS recommendation than those reporting excellent health. Furthermore, those with a disability and with one or more chronic diseases were nearly 40% less likely to meet the MS recommendation than no disability. Among respondents without disability, being Black and being a healthy weight or underweight increased the odds of meeting the MS recommendations.

Conclusions: Several health and sociodemographic factors were associated with not meeting MS recommendations. Persons with disability and poor health, had the lowest likelihood of participation. Studies are needed to understand whether improving MS exercise behavior may attenuate functional limitations associated with chronic diseases and aging.

Introduction

Current physical activity recommendations are that adults 18+ years of age participate in muscle strengthening (MS) exercises that target all major muscle groups on two or three days per week [1, 2]. Yet, less than a third of US adults meet this recommendation[3]. MS exercises increase muscular strength and endurance, enhance muscle mass and quality[4], promote bone health [5], and improve physical function [6]. The health benefits associated with MS exercises become increasingly important with age, as participating in MS exercise may reduce the risks of disability, falling, and extend independence [6-12]. Conversely, poor muscle strength can lead to a cascade of adverse events that result in increased all-cause mortality and chronic disease morbidity, mobility limitations, fear of falling, falls, and reduced quality of life—all of which can contribute to the loss of independence [6, 13-19].

People with physical disabilities often are less physically active than persons without physical disabilities [20-22]. This is concerning as insufficient physical activity can exacerbate the functional limitations associated with disabling conditions [2, 10, 23-26]. Moreover, people with disability and co-morbid chronic diseases are more likely to report less physical activity and more unhealthy behaviors that can lead to a cycle of worsening health and disability [27].

While having a disability is often considered a problem of particular concern among older adults, recent studies suggest there is an increasing incidence of disability in middle-aged adults [28]. Concurrently, the incidence of physical function impairments have plateaued in older adults while these impairments have multiplied in middle-aged adults [28]. Additionally, there is an escalating incidence of preventable chronic diseases, especially conditions in which insufficient exercise plays a contributory role in physical function impairments [28, 29]. There is

a need to understand factors associated with meeting the MS recommendation, and to explore the associations between participation in MS exercises and health among middle-aged and older adults with and without disability to guide intervention development. The current study aimed to identify sociodemographic characteristics and health-related factors associated with meeting the MS recommendation in middle-aged and older adults with or without disability in a representative national sample of US adults. We hypothesized that factors associated with meeting the MS recommendation may differ between middle-aged and older adults. Additionally, we hypothesized that older adults and adults with disability will be less likely to meet the MS recommendation than middle-aged adults and adults without disability.

Methods and Procedures

The study sample was drawn from the 2011 Behavioral Risk Factor Surveillance System (BRFSS) [30]. The BRFSS is a random-digit dialing telephone-based health survey used to collect self-reported health information from adults 18+ years of age in all 50 US states, the District of Columbia, and Puerto Rico [31]. It is the largest telephone health survey in the world, and states use the BRFSS data to identify emerging health problems, establish and track progress on meeting health objectives, and develop and evaluate public health policies and programs [31]. The study sample was limited to BRFSS respondents with complete data on MS exercise participation and variables used to determine disability status. Participants with missing data or who answered, "don't know" or "refused" to any of the examined socio-demographics and chronic disease questions were excluded from the respective analyses.

Disability status

Respondents were classified by disability status (with disability or without disability) using two BRFSS items consistent with the World Health Organization definitions of disability [32]. Respondents were considered to have a disability if they reported having an activity limitation due to physical, mental, or emotional problems; or they used special equipment (such as a mobility aid), or they met both criteria. Those who answered "no" to both questions were considered to be a person without disability.

MS Exercise

Respondents answered the following question assessing participation in MS exercises: "During the past month, how many times per week or per month did you do physical activities or exercises to STRENGTHEN your muscles? Count activities using your own body weight like yoga, sit-ups or push-ups and those using weight machines, free weights, or elastic bands." [30].

Responses options to this question were dichotomized as meeting or not meeting the MS recommendation. Respondents who answered ≥ 2 times per week or ≥ 8 times per month were classified as meeting the MS recommendation, while respondents who reported participating 0 or 1 times per week (or ≤ 8 times per month) were classified as not meeting the recommendation [30]. This classification scheme is consistent with current U.S. recommendation for MS exercise, which recommends participating in MS exercises 2 or more times per week [33].

Sociodemographics

Examined sociodemographic characteristics included age, sex, race/ethnicity (white non-Hispanic, Black non-Hispanic, Hispanic or other), marital status (married, widowed, divorced, separated, never married, unmarried couple); education (high school or less, high school graduate, attended some college/technical school, or graduated college/technical school), and

household income ($\leq$\$15,000, >\$15,000 $\leq$\$25,000, >\$25,000 $\leq$\$35,000, >\$35,000 to $\leq$\$50,000, >\$50,000). As only a few respondents in the sample identified as Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, these categories were combined as "other" for analysis.

Health-related measures

Self-Perceived Health Status:

Respondents reported their perceived health status by answering one question that asked them to rate their health (excellent, very good, good, fair, poor.) This question, derived from the SF-36, is predictive of morbidity and mortality, and of the composite physical and mental health scores of the SF-36 [34].

Chronic Disease Status:

Respondents indicated whether or not a health care provider had told them they had asthma, cardiovascular diseases (stroke or coronary heart disease), arthritis, and diabetes. Participants also reported their height and weight, which was used to calculate body mass index (BMI); underweight (<18.5kg/ m^2), healthy weight (18.5-24.9kg/ m^2), overweight (25-29.9kg/ m^2), or obese (≥30kg/ m^2) [35].

Statistical Analyses

The analyses used for this study used a weighing methodology by the Centers for Disease Control (CDC) known as iterative proportional fitting or raking. This method, applied to the raw data, adjusts for each variable individually in a series of data processing–intensive iterations and allows for the incorporation of data obtained from both landline and cellular telephones. Each

variable in the weighting process is included in the model, and the weights are adjusted until the sample weights are representative of the population. Raking does not require demographic information for small geographic areas, and allows variables to be included in the weighting process, which increases the representativeness of estimates[31].

Descriptive Analyses

Descriptive characteristics of the sample were calculated as means and standard deviations for continuous variables, while categorical variables were reported as frequencies and percentages. Sociodemographic characteristics were evaluated by disability status and age groups using crosstabs analyses.

Logistic Regression Analyses

Two enter method logistic regression models were created to examine potential sociodemographic and health-related correlates of meeting the MS recommendation, stratified by disability status. Prior to conducting the logistic regression analyses, biserial correlation analyses assessed the potential of multicollinearity among the independent variables. Correlations greater than $r=0.8$ were considered to be indicative of multicollinearity and, as a result, income was excluded from the analysis due to collinearity with education. In these models, chronic disease status was dichotomized as the presence one or more chronic disease (yes, no). All analyses were executed using SPSS Statistics Software (Windows version 24. IBM, Inc., Armonk, NY, USA).

Results

The sample included 477,662 adults ages 45 years and older. Table 1a shows the sociodemographic and health-related characteristics stratified by MS recommendations. Respondents who more often met MS recommendation were males, those without disability. those with a healthy weight, middle-aged, better educated and married were more likely to meet the MS recommendation (p< 0.001).

Among those who met the MS recommendation, regardless of disability status, more men, middle-aged, married persons, those with higher incomes and greater education more often met the MS recommendation. The majority of persons with disability who met the MS recommendation were of healthy weight or underweight, and reported their health to be good, very good, or excellent (see Table 1b).

Respondents with one or more chronic diseases were 1.5 (1.58: 1.20-2.08 95%CI) times more likely to meet MS recommendations (Table 2). Further, people with disability were only slightly more likely to meet the MS recommendation than people without disability. However, those with obesity were less likely to meet the MS recommendation. Goodness of fit index reported about a 9% of the variance in the outcome (Table 2 and 3).

Table 3 presents the two logistic regression models that evaluated the correlates of meeting the MS recommendation by disability status. Model one was limited to persons with disability while Model 2 included all respondents. In model 1, men were nearly 25% (1.24: 1.16-1.32 95% CI) more likely to meet the MS recommendations than women. Additionally, middle-aged with more education were more likely to meet the MS recommendation. In this model, individuals who were a healthy weight or underweight were almost twice as likely to meet in MS recommendation than individuals with obesity. Persons identifying as Black were about 25%

more likely to meet the MS recommendation than those identifying as white. Divorced respondents were nearly 15% less likely to meet MS recommendations than married respondents, while those who were widowed were slightly more likely to meet the MS recommendations.

Discussion

A worrisome trend is the escalation in the number of middle-aged adults who have a disability, mainly resulting physical function impairments [28]. The primary contributory factors to the increasing incidence of disability in middle-aged adults are preventable chronic diseases (e.g., Type 2 diabetes mellitus, cardiovascular diseases, obesity, conditions such as arthritis) in which physical activity, especially MS exercise, can help maintain physical function and improve overall health [28]. Interestingly, in the full analytic sample (including those with and without disability), being middle-aged (vs. older age), or male were associated with meeting MS recommendation, while higher BMI was associated with a lower likelihood of sufficient participation in MS exercises.

Among persons with disability, respondents with a healthy body weight or underweight were about 1.5 to 1.8 times more likely to meet the MS recommendation than persons with obesity. Additionally, those with disability who were married, earned a higher income, and had a higher education level were more likely to meet the MS recommendations.

Race/ethnicity was only associated with meeting the MS recommendation among people without disability, with those identifying as Black being about 25% more likely to engage in MS recommendations than whites. Several variables were associated with a lower likelihood of participation in meeting MS recommendation, which were similar among people with or without a disability. This included having less than excellent health, having one or more chronic disease

(those without disability), divorced, and having an educational attainment of less than college graduation.

Determining who engages in sufficient MS exercise is important because MS exercises have considerable benefits for health, function, fitness, and longevity [13-17]. Previous population-based studies focused on the prevalence of MS exercise participation in select populations such as those with lower back pain, neuromuscular, and musculoskeletal diseases, however in both meta-analyses, there were either no benefits or benefits with further investigations needed, indicating that more studies need to explore this topic [36, 37]. The present study extends this limited research on MS exercise participation in select samples which found that participation in MS exercise are associated with overall function and quality of life in middle-aged and older adults [15, 38, 39] although few of these studies examined the association with disability. Results of the present study are similar to prior studies that have found that people who identify as having a disability participate in less aerobic physical activity and those who are physically active [40]. Our previous research evaluated the associations between chronic disease and disability prevalence and meeting aerobic and MS recommendations in younger, middle aged and older adults[41]. This current study further extends the understanding about MS participation and shows that in the general US adult population engagement in MS exercise is low, and even lower in those with a disability compared to those without disability.

Previous studies report a strong association with aerobic physical activity and health status among adults [7, 39, 42], where persons who perceived themselves as being in excellent or good health were more likely to meet the recommendations for aerobic physical activity compared with those in who perceive their health as being poor. Although not focused on MS exercises, Garber et al. observed that rarely feeling healthy or full of energy was a strong

11

correlate of being in the earlier stages of change (precontemplation, contemplation in preparation) for physical activity, which is a surrogate indicator of participation in insufficient aerobic physical activity [39]. People with poorer health may be less likely to participate in MS exercises as well. In the current study, we found that those who perceived themselves as being in poor health were nearly 60% less likely to meet the MS recommendation than those with excellent health. Moreover, people with a disability often report poorer health status than persons without disability and may have additional barriers to physical activity participation compared with people without disability, including pain and fatigue [43]. Additionally, in the total sample, (table 2 and 3), chronic disease status was associated with either greater (table 2) or lesser participation (table 3). This is intriguing as it suggests that the presence of chronic disease is may be a barrier and facilitator of exercise participation. Similar findings were reported in a study of stages of behavior change for exercise in Rhode Island adults where having a health limitation was associated with both being in the precontemplation and being in the action stage for exercise[39]. These results of our study and that of Garber et al suggests that there may be complex interactions between physical activity behavior and health status, perceptions of health, perceived functional limitation that are worthy of further study.

Our study contributes to the existing literature by identifying health-related correlates associated with meeting the MS recommendations with self-reported health status in both middle-aged and older adults across disability status. Middle-aged adults with or without a disability in our study were more likely to meet the MS recommendations than were older adults. Vezina et al (2014) reported similar rates of MS exercise participation in a general adult population: however, they did not look for differences in MS exercise participation by disability status. Middle-aged persons are of working age and the potential economic and long-term impact

of disabling conditions could be substantial, particularly as these individuals age. The primary

contributory factors to the increasing incidence of disability in middle-aged adults are

preventable chronic diseases (such as diabetes, cardiovascular diseases, and obesity, or

conditions such as arthritis) in which physical activity, especially MS exercise, can help maintain

physical function and improve overall health [28], and so there is good reason to think that

promoting physical activity might be part of an effective interventions [28, 44].

The current study determined that self-reported health status, age, sex, and education

were associated with meeting the MS recommendations, irrespective of disability status. It is

well known that physical activity is important for the health of all adults, including people with

disability [45, 46]. However, because there are limited studies examining physical activity

among people with disability, our results are important as they help to identify subpopulations

who are in more urgent need of intervention and potential behavioral targets for interventions.

Further research examining how sociodemographic characteristics and health status may affect

MS exercise participation in people with disability is needed to guide the development of

effective interventions to promote the adoption and maintenance of participating in MS

exercises.

Limitations:

This study has several limitations. The BRFSS sampling methods include only non-

institutionalized adults with telephones and adults willing or able to answer the telephone thus it

likely underestimates the prevalence of disability in the population, and possibly

disproportionately in older adults [8, 47]. This study relied on self-report measures [38].

Furthermore, this was a cross-sectional study, which does not allow for causal inferences.

Nonetheless, surveillance studies study individuals' perception of their physical activity levels (compared to objectively measured physical activity) and strongly predict mortality, even though it can lead to over estimation of physical activity [48]. The definition of disability was based on self-reporting of limitations due to physical, mental or emotional problems, and the reported use of special equipment, and so it was a broad definition of functional limitations. Nonetheless, due to its breadth, it made it difficult to identify all of the specific limitations of the respondents [38]. The BRFSS items did not allow us to determine what type of disability respondents have, and so the types and causes of disability were combined together into one variable, as opposed to separating different types of disabilities in BRFSS. By stratifying different types of disability, there could be different interpretations of the prevalence of meeting the MS strengthening exercise recommendations and the associations between disability and MS participation. The recommendations for MS strengthening exercises address exercise dose by including the elements of frequency and intensity, but the BRFSS question only addresses frequency and does not assess intensity. It is possible that the self-report over-estimated the proportion of respondents who met MS recommendations. The missing data in some instances (i.e., sociodemographics and chronic diseases) was greater than 5% of the data, and is not likely missing completely at random. Therefore, results apply only to the subset of the population who would answer these types of questions, and not the population as a whole from which the sample was drawn. Moreover, the chronic disease questions in the BRFSS asked if the individual had ever been told by a doctor or health professional they had been diagnosed with a disease, and this probably resulted in under-reporting of the actual presence of disease.

Conclusions

In this study, we identified the correlates of MS participation among people with and

without disability. Regardless of disability status, middle-aged respondents were more likely

than older adults to meet MS recommendations. Additionally, regardless of disability status,

people with healthy weight, more education, and excellent health more often met the MS

recommendation. Persons with disability and those who had a chronic disease(s) were less likely

to meet the MS recommendation compared to those without disability. Trends in physical

function impairments support the urgency of addressing increasing disability and the associated

public health implications in adults, especially when interventions may attenuate these trends.

Further studies are needed to understand more fully the activity choices of persons with disability

and self-perceived health status, and whether improving MS exercise behavior may attenuate

functional limitations associated with chronic diseases and aging.

Disclosure statement

The authors report no conflicts of interest.

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Table 1a: Descriptive Characteristics of BRFSS Respondents by Meeting MS Recommendations

Age, Disability, Muscle Strengthening Recommendations

(n= 477,662; missing data = 28,803 (5.7%)).

		Met MS recommendations	
Variable		Yes (n=353,420)(%)	No (n=124,242) (%)
Sex	Male	45.2	37.1
	Female	54.8	62.9
Age	45-64 years (middle-aged)	60.6	55.5
	65+ years older adults	39.4	44.5
Disability status	Persons with Disability	25.6	32.8
	Persons without Disability	74.4	67.2
Income	Less than $15,000	8.8	13.9
	$15,000 to less than $25,000	14.0	19.5
	$25,000 to less than $35,000	10.4	12.5
	$35,000 to less than $50,000	14.3	15.2
	$50,000 or more	52.5	38.9
Education	Did not graduate High School	5.2	10.2
	HS Graduate	22.2	31.7
	Attended College/Technical	27.2	27.1
	Graduated College/Technical	45.4	31.0
Marital Status	Married	54.5	53.2
	Divorced	10.0	15.0
	Widowed	13.5	14.4
	Separated	1.9	2.2
	Never Married	17.3	12.7
	Member of an Unmarried Couple	2.9	2.4
Race	White - Non-Hispanic	80.9	79.7
	Black - Non-Hispanic	7.8	8.2
	Hispanic	6.7	8.1
	Other	4.6	4.0
Asthma	Yes	12.3	13.1

Age, Disability, Muscle Strengthening Recommendations

Past Stroke	Yes	3	4.4
Past Angina or Coronary Disease	Yes	4.5	6.5
Arthritis	Yes	35.3	28.4
Diabetes	Yes	8.1	13.8
BMI	Underweight need to define categories	1.7	1.7
	Normal	41.6	31.4
	Overweight	36.9	36.1
	Obese	30.9	19.9
Health Status	Excellent	24.3	12.5
	Very Good	35.1	29.3
	Good	26.1	33.0
	Fair	10.3	17.2
	Poor	4.2	8.1

Note: Table includes some missing values due to responses that were missing, refused and unknown. P value refers to crosstabs analysis for each variable categories by aerobic categories. Each row chi-square is statistically significant (p<0.01).

Table 1b: Descriptive Characteristics of a Representative National Sample of Disability and MS Recommendations by Meeting MS Recommendation

Variable		Persons with Disability		Persons without Disability	
		Meeting MS Recommendation (%)	Not Meeting MS Recommendation (%)	Meeting MS Recommendation (%)	Not Meeting MS Recommendation (%)
Sex n=472,773 (93.3%) missing=33,694 (6.7%)	Male	24.6	75.4	32.2	67.8
	Female	19.9	80.1	25.2	74.8
Age n=344,288 (93.5%) missing=24,002 (6.5%)	45-64	21.6	78.4	27.0	73.0
	65 and older	19.5	80.5	23.0	77.0
Income n=294,723 (80%) missing=73,567 (20%)	Less than $15,000	15.7	84.3	16.2	83.8
	$15,000 to less than $25,000	17.3	82.7	18.4	81.6
	$25,000 to less than $35,000	19.5	80.5	21.0	79.0
	$35,000 to less than $50,000	21.8	78.2	23.5	76.5
	$50,000 or more	28.2	71.8	31.9	68.1
Education n=471.799 (93.2%) missing=34,668 (6.8%)	High School or less	13.0	87.0	17.0	83.0
	HS Graduate	16.6	83.4	21.3	78.7
	Attended some College/Technical	22.3	77.7	27.9	72.1
	Graduated College/Technical	30.2	69.8	35.2	64.8
Marital Status n=470,916 (93%) missing=35,551 (7%)	Married	22.6	77.4	27.8	72.2
	Widowed	20.7	79.3	27.4	72.6
	Divorced	17.5	82.5	20.1	79.9
	Separated	19.9	80.1	25.5	74.5
	Never Married	25.8	74.2	34.6	65.4
	A Member of an Unmarried Couple	25.7	74.3	30.6	69.4
Race/ethnicity n=459,183 (90.7%) missing=47,284 (90.3%)	White - Non-Hispanic	21.9	78.1	28.2	71.8
	Black - Non-Hispanic	19.7	80.3	27.6	72.4
	Hispanic	23.0	77.0	23.7	76.3
	Other	28.6	71.4	30.5	69.5

Age, Disability, Muscle Strengthening Recommendations

Asthma n=60,888 (28.6%)	Yes	20.7	79.3	28.7	71.3
Stroke n=18,903 (10.5%)	Yes	18.7	81.3	20.5	79.5
Coronary Disease n=28,303 (15.3%)	Yes	19.5	80.5	22.3	77.7
Arthritis n=157,784 (54.8%)	Yes	20.5	79.5	24.1	75.9
Diabetes n=58,129 (29.4%)	Yes	16.6	83.4	17.4	82.6
BMI n=449,966 (88.8%) missing=56,501 (11.2%)	Underweight	20.2	79.8	29.5	70.5
	Normal	26.8	73.2	34.1	65.9
	Overweight	23.1	76.9	28.3	71.7
	Obese	17.3	82.7	19.9	80.1
Health Status n=471,061 (93%) missing=33,695 (6.7)%	Excellent	38.5	61.5	40.0	60.0
	Very Good	29.4	70.6	29.2	70.8
	Good	21.6	78.4	21.1	78.9
	Fair	17.0	83.0	15.4	84.6
	Poor	14.4	85.6	13.6	86.4

Note: Table includes some missing values due to responses that were missing, refused and unknown. MS recommendations included 2+ times per week of exercises.

Table 2: Likelihood of Meeting MS Recommendations in a Nationwide Sample of 332,820 Adults Ages 45 years and Above

Age, Disability, Muscle Strengthening Recommendations

	Variable	Odds Ratios (95% CI)Ψ
Sex	Male	**1.29 (1.26-1.33)**
	Female	Ref
Age	45-64 years	**1.18 (1.15-1.21)**
	65+	Ref
Disability	Persons with Disability	**1.09 (1.05-1.13)**
	Persons without Disability	Ref
Health Status	Excellent	Ref
	Very Good	**0.67 (0.65-0.69)**
	Good	**0.49 (0.47-0.51)**
	Fair	**0.38 (0.36-0.41)**
	Poor	**0.32 (0.28-0.36)**
Chronic Disease	Yes	**1.58 (1.20-2.08)**
	No	Ref
BMI	Underweight	**2.05 (1.86-2.26)**
	Healthy weight	**1.97 (1.90-2.05)**
	Overweight	**1.48 (1.43-1.54)**
	Obese	Ref
Education Level	High School or less	**0.41 (0.38-0.44)**
	High School Graduate	**0.51 (0.50-0.53)**
	Attended College/Technical School	**0.71 (0.69-0.73)**
	Graduated College/Technical School	Ref
Race/Ethnicity	White - Non-Hispanic	Ref
	Black	**1.21 (1.15-1.28)**
	Hispanic	1.02 (0.96-1.08)
	Other	1.05 (0.98-1.12)

Persons were classified as persons with disability if they reported an activity limitation and that they used special equipment, such as a mobility aid. Those answering "no" to both questions were classified as persons without disability. BMI is defined as kg/m^2. Underweight: < 18.5; Normal: 18.5-24.9; Overweight: 25.0-29.9; Obese: ≥30.

Table values are odds ratios. Ψ 95% Confidence Interval (CI) for OR was calculated from the standard error.

Significant valued are bolded.

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	154167.503[a]	.060	.087

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Table 3: Logistic Models Showing Likelihood of Meeting MS by Disability Status in a Nationwide Sample of Adults Aged 45 Years and Above (n=344,288)

Age, Disability, Muscle Strengthening Recommendations

	Variable	Disability Odds Ratios (95% CI)Ψ	No Disability Odds Ratios (95% CI)Ψ
Sex	Male	**1.24 (1.16-1.32)**	**1.31 (1.27-1.34)**
	Female	Ref	Ref
Age	45-64 years	**1.20 (1.13-1.28)**	**1.13 (1.09-1.16)**
	65+	Ref	Ref
Health Status	Excellent	Ref	Ref
	Very Good	**0.72 (0.65-0.79)**	**0.67 (0.65-0.69)**
	Good	**0.54 (0.49-0.60)**	**0.48 (0.46-0.50)**
	Fair	**0.43 (0.38-0.48)**	**0.37 (0.34-0.40)**
	Poor	**0.36 (0.31-0.42)**	**0.31 (0.25-0.40)**
Chronic Disease	Yes	**0.63 (0.47-0.84)**	1.27 (0.46-3.48)
	No	Ref	Ref
BMI	Underweight	**1.46 (1.17-1.82)**	**2.26 (2.02-2.52)**
	Healthy weight	**1.84 (1.69-2.00)**	**2.01 (1.92-2.09)**
	Overweight	**1.50 (1.38-1.63)**	**1.48 (1.42-1.55)**
	Obese	Ref	Ref
Education Level	High School or less	**0.36 (0.31-0.42)**	**0.43 (0.40-0.46)**
	High School Graduate	**0.50 (0.46-0.55)**	**0.52 (0.50-0.54)**
	Attended College/Technical School	**0.73 (0.68-0.78)**	**0.71 (0.69-0.74)**
	Graduated College/Technical School	Ref	Ref
Race/Ethnicity	White - Non-Hispanic	Ref	Ref
	Black	1.00 (0.87-1.16)	**1.25 (1.18-1.33)**
	Hispanic	0.93 (0.79-1.09)	1.03 (0.97-1.10)
	Other	1.04 (0.87-1.24)	1.06 (0.98-1.14)
Marital Status	Married	Ref	Ref
	Widowed	0.97 (089-1.05)	**1.07 (1.033-1.12)**
	Divorced	**0.83 (0.75-0.92)**	**0.85 (0.81-0.89)**
	Separated	1.20 (0.95-1.50)	1.10 (0.99-1.23)
	Never Married	1.00 (0.90-1.11)	0.98 (093-1.03)
	Member of unmarried couple	0.99 (0.79-1.26)	1.08 (0.97-1.20)

Persons were classified as persons with disability if they reported an activity limitation and that they used special equipment, such as a mobility aid. Those answering "no" to both questions were classified as persons without disability. BMI is defined as kg/m^2. Underweight: < 18.5; Normal: 18.5-24.9; Overweight: 25.0-29.9; Obese: ≥30.

Table values are odds ratios. Ψ 95% Confidence Interval (CI) for OR was calculated from the standard error. Significant valued are bolded.

Model Summary[a]			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	128906.853[b]	.061	.088

a. Disability Category = No Disability

b. Estimation terminated at iteration number 5 because

parameter estimates changed by less than .001.