Published in final edited form as:

Am J Health Promot. 2015 ; 29(4): 266–272. doi:10.4278/ajhp.130531-QUAN-282.

Validity of Self-Reported Fitness Across Black and White Race, Gender, and Health Literacy Subgroups

NiCole R. Keith, PhD, Daniel O. Clark, PhD, Timothy E. Stump, MS, and Christopher M. Callahan, MD

NiCole R. Keith, PhD, is with the Department of Kinesiology, Indiana University–Purdue University Indianapolis, Indianapolis, Indiana. Daniel O. Clark, PhD; Christopher M. Callahan, MD; and NiCole R. Keith, PhD, are with the Indiana University Center for Aging Research, Division of General Internal Medicine and Geriatrics, Indiana University School of Medicine and Regenstrief Institute, Inc., Indianapolis, Indiana. Timothy E. Stump, MS, is with the Division of Biostatistics, Indiana University School of Medicine, Indianapolis, Indiana

Abstract

Purpose—To compare concurrent criterion validity of the Self-Reported Fitness (SRFit) Survey, a new fitness measure, between black and white race, gender, and health literacy groups.

Design—Cross-sectional.

Setting—Midwest urban primary care center and commercial fitness center.

Subjects—One hundred one black, white, male, and female primary care patients aged 40 years.

Measures—Measures included demographics, the Rapid Estimate of Adult Literacy in Medicine, the SRFit Survey, and the Rikli and Jones Senior Fitness Test battery of physical tests. The BodPod determined percentage of body fat. Body mass index was calculated.

Analysis—Concurrent validity was assessed using Pearson and Spearman rank order correlations between corresponding physical tests and SRFit survey items.

Results—Correlations between physical tests and SRFit items ranged from $r=.52$ to $.76$ ($p=.41-.85$) in males, $r=.40$ to $.79$ ($p=.33-.80$) in females, $r=.45$ to $.79$ ($p=.53-.82$) in blacks, and $r=.49$ to $.77$ ($p=.33-.82$) in whites. Correlations were $r=.58$ ($p=.58$) to $r=.77$ ($p=.79$) in persons with low health literacy and $r=.50$ to $.79$ ($p=.39-.85$) among persons with moderate to high health literacy.

Conclusion—SRFit shows similar concurrent validity across race, gender, and health literacy subgroups.

Keywords

Fitness; Measurement; Health Literacy; Race; Gender; Prevention Research; Manuscript format: research; Research purpose: instrument development; Study design: cross-sectional; Outcome

measure: cognitive; physical; Setting: clinical/fitness center; Health focus: fitness; Strategy: education; Target population: adults; Target population circumstances: race; gender; health literacy

---

INTRODUCTION

Over the past several decades, physical activity and fitness have been shown to be crucial to maintaining health and avoiding or delaying chronic illness.^{1–4} As part of broader efforts to assess individual risk or monitor population health, self-report physical activity and fitness surveys have been developed and validated.^{5–10} These surveys have often proven to be useful for surveillance, research, or clinical purposes.¹¹ The extent to which these surveys are beneficial depends in part, however, on their validity in groups that suffer the most from fitness-related illnesses—certain minorities and people with lower health literacy, for example.^{12–15}

Physical fitness is a well-documented determinant of health and longevity. Higher levels of physical fitness have been associated with decreased risks of cardiovascular disease and mortality.^{4,16} In addition, to addressing chronic illness risk, physical fitness delays functional decline and disability onset while increasing one's ability to perform activities of daily living and maintain overall independence.^{17,18} Morey et al. propose a theoretical model that suggests that disability onset is influenced by functional status, which is directly influenced by individual health-related fitness domains.¹⁹ Gabriel et al. present a conceptual framework wherein physical activity behaviors (e.g., leisure time, occupational, and transportation activities) directly influence health-related physical fitness.²⁰ Evidence-based community assessments can inform the allocation of public health funds.²¹ Identifying the role of specific physical fitness domains in overall health could support allocation of resources toward improving community health outcomes. Detecting levels of physical fitness in specific domains could lead to policy efforts and resources toward improving those domains.

There are five health-related fitness domains, including muscular strength, muscular endurance, cardiorespiratory endurance, flexibility, and body composition (BC).²² Physical activity is important in preventing illness and disability primarily because of its influence on physical fitness. Existing physical activity surveys do not capture activities in every fitness domain and typically not in more than one. Performance-based fitness assessments require trained staff, space, and staff time. For these reasons, fitness assessments are uncommon in primary care clinics or population surveillance and are even performed on a limited basis in fitness centers.^{23,24}

A valid fitness survey could lead to more domain-specific recommendations than those currently derived from physical activity surveys and would overcome some of the limitations of performance-based assessments.^{25–27} Existing survey measures of physical fitness are very few and incomplete. Accordingly, we developed and validated a self-reported fitness measure (the Self-Reported Fitness [SRFit, pronounced “senior fit”] survey) that, to our knowledge, is the only tool that evaluates all five health-related fitness domains.^{9,22,25}

As noted above, a survey instrument will ideally be valid across many demographic subgroups. It is possible and perhaps likely that the accuracy of self-reported physical fitness varies by gender or race, for example.²⁸ Several studies have found gender differences in the accuracy of self-reported height and weight.^{29,30} Other studies have shown differences in reporting by race^{28,30} and health literacy.^{31,32}

To continue development of the SRFit instrument, in the present study we compare concurrent criterion validity of the SRFit survey across gender, race, and health literacy levels. Our sample is made up of middle- to older-aged adults recruited from a community health center (CHC) that is part of an urban safety net health system. Evidence of differential validity will indicate that improvements to the survey are needed or that survey items must be tailored to improve validity in certain subgroups. Evidence of equivalence will further justify the broad use of the fitness survey.

METHODS

Recruitment and Participant Characteristics

This cross-sectional study was approved by the Indiana University (IU) Institutional Review Board. Participant recruitment occurred at Midwestern, urban CHCs. The IU Research Network (ResNet) recruiters who worked in the CHCs invited participants to join the study. Using the health system's electronic medical records system, ResNet research assistants (RAs) were provided with a race-gender-stratified list of potentially eligible patients and the date and time of an upcoming CHC visit. Those patients who kept their CHC visit appointment were approached by the RA. ResNet RAs approached patients until 25 black male, 25 white male, 25 black female, and 25 white female participants were recruited. Because recruitment occurred at three CHCs, one additional white male was recruited before the staff realized that the goal for the white male sample had been met. The recruitment rate was between 60% and 65% among the groups. A commercial fitness center located less than 2 miles from all CHCs served as the testing site where eligibility was confirmed and informed consent was obtained. Participants who completed the surveys and physical tests received a \$50 cash incentive.

Participants were deemed eligible if they self-reported being able to (1) walk without assistance, (2) independently move from standing to sitting on a chair and back up, (3) move elbow and wrist joints within a normal range of motion, (4) speak English, and (5) access and use a telephone. Participants were excluded if (1) they made five or more errors on the Short-Portable Mental Status Questionnaire, indicating moderate to severe cognitive impairment³³; and/or (2) their primary care physician refused permission to enroll in the study because of terminal illness (not expected to live beyond 1 year) and/or American College of Sports Medicine absolute contraindications to exercise (e.g., class D: unstable disease with activity restriction).³⁴

Gender, Race, and Health Literacy

After participant eligibility was confirmed and consent was obtained, participants completed a demographic survey in which they reported the gender and race to which they most closely

self-identified. Response options included white, black or African-American, Asian, native Hawaiian or other Pacific Islander, American Indian or Alaskan native, other, don't know, and refused. In order to determine health literacy, participants were asked to pronounce items from the Rapid Estimate of Adult Literacy in Medicine (REALM-R) tool, which is an eight-item instrument used to screen participants for potential health literacy problems. A score of 6 or less on the REALM-R indicated low health literacy and a score greater than 6 indicated acceptable health literacy.³⁵

Survey and Physical Test

To evaluate self-reported fitness, we used the SRFit survey, which took less than 10 minutes to complete. Each SRFit survey item described a movement performed during the previously validated Rikli and Jones Senior Fitness Test battery of physical tests.³⁶ Percentage body fat and body mass index (BMI) were also evaluated by the SRFit survey. The 22-item survey assessed the participant's self-reported upper-body strength and endurance (UBS; three items), lower-body strength and endurance (LBS; three items), upper-body flexibility (UBF; six items), lower-body flexibility (LBF; four items), cardiovascular fitness (CVF; three items), and BC (three items). The possible summary score ranges for each domain were UBS, 0–15; LBS, 0–15; UBF, 0–30; LBF, 0–20; CVF, 0–15; and BC, 0–15. A higher score indicated a higher level of fitness. For example, one item asked, “How hard is it for you to move from a standing position to a seated position on the middle of a hard surface chair without using your arms?” For items that inquired about difficulty level, the response options were “not hard at all,” “somewhat hard,” “hard,” “very hard,” “can't do it,” or “don't know.” Another item asked, “How many times do you think you can move from a seated to a standing position without using your arms in 30 seconds (or half of a minute)?” For this item, the possible responses were “18 or more,” “12 to 17.5,” “8 to 11.5,” “4 to 7.5,” “can't do it,” or “don't know.” Half scores were possible. For example, a participant could have reported a score of 11.5 if he thought he could move from a standing to a seated position 11 times but could not return to a standing position the 12th time in a 30-second time frame. The response “18 or more,” received a score of five, each subsequent item score declined by one point, and “don't know” received a score of zero. Details of the development and scoring of the 22-item SRFit survey can be found elsewhere.⁹

Following consent and survey completion, in the same private, quiet room, the participant remained silent and seated for an additional 5 minutes. Next, resting heart rate and resting blood pressure were measured using an A&D UA-767 Digital Blood Pressure Monitor and LifeSource large or regular adult automated blood pressure cuff (A&D Medical, San Jose, California). The manometer was checked to insure calibration prior to use. Participant height was measured using a wall-mounted stadiometer (Seca, Birmingham, United Kingdom). Weight and BC were measured using the BodPod scale and air displacement plethysmography system (Life Measurement Inc., Concord, California). The Bod-Pod was calibrated each morning before any testing occurred that day. The BodPod scale was calibrated weekly. Gas exchange was not measured; instead, lung volume was estimated by the BodPod. The Siri and Brozek³⁷ body density formula was used for white participants and the Schutte³⁸ body density formula was used for African American participants.

We then measured physical fitness across all health-related fitness domains using the Senior Fitness Test as the gold standard test for this study. The Senior Fitness Test has established validity and reliability and has been used to assess fitness among thousands of older adults.³⁹ In this battery of physical tests, UBS was evaluated using the arm curl test. Participants were asked to use their dominant arm and complete as many arm curls as possible in 30 seconds. Men used an 8-lb dumbbell and women used a 6-lb dumbbell. LBS was measured using the chair stand test. Participants were asked to sit on a hard-surfaced chair and return to standing without using their arms or other items for assistance for as many times as possible in 30 seconds. UBF was evaluated using the back scratch test. The score represented one's ability to reach over and under opposite shoulders and touch or overlap the fingers of opposite hand (a negative number was the distance between fingers and a positive number was the amount fingers overlapped). LBF was evaluated using the chair sit and reach test. The score was the distance one could bend at the waist and reach the fingers down one leg (a negative number was the distance between the middle fingers and the toes and a positive number was the distance the fingers exceeded the toes). CVF was evaluated using the summary estimate of the distance walked (meters) during the 6-minute walk test. Participants were asked to walk as far and as fast as they could in 6 minutes. Participants walked on a flat, rubberized, indoor track. Participants performed most tests one time (UBF and LBF tests had two trials and the better of the two scores was used). The physical measures took approximately 30 minutes to complete.³⁹ All tests were completed in the fitness center assessment room and on the indoor track. Complete details of the physical tests are reported elsewhere.⁹

Analyses

All data were analyzed using SAS/STAT® 9.2 User's Guide (2008; SAS Institute Inc., Cary, North Carolina). Missing data were handled by using pairwise deletion. Descriptive statistics (means and percentages) were created and compared across subgroups (i.e., blacks vs. whites, males vs. females, and acceptable health literacy vs. low health literacy). The Senior Fitness Test and SRFit survey results were plotted and graphed to ensure normality of the continuous variables. Concurrent validity was assessed using Pearson and Spearman rank order correlations of the interval data in the physical tests and the categorical data in the surveys. Correlations were computed only between corresponding Senior Fitness Tests and SRFit survey items and are presented and compared across the subgroups of interest. The general linear model was performed and F-tests were used to make multiple group comparisons. Results were considered to be statistically significant if the α level was $< .05$.

RESULTS

Demographic data, heart rate, blood pressure, and REALM-R comparisons between blacks and whites are presented in Table 1 and between males and females in Table 2. Mean (SD) age was 54.35 (8.07) and mean (SD) years of education was 12.13 (2.49). Race and gender comparisons indicated no differences in age and years of education. No participants demonstrated severe arterial hypertension (e.g., a systolic blood pressure >200 mm Hg and/or a diastolic blood pressure >110 mm Hg)⁴⁰ and all were able to safely participate in exercise testing. REALM-R scores were higher for white compared to black ($p < .01$) and

for female compared to male participants ($p < .05$). There were no significant differences in self-report or physical measures when blacks and whites were compared (Table 1).

There were several differences when SRFit survey scores of males and females were compared (Table 2). Males reported higher scores for UBS ($p < .01$), LBS ($p < .01$), LBF ($p < .01$), and CVF ($p < .001$). Males also reported lower scores for BC ($p < .01$). There also were several differences when physical fitness measures of males and females were compared. Males demonstrated greater UBS ($p < .001$), LBS ($p < .01$), and CVF ($p < .01$). Females had lower systolic ($p < .01$) and diastolic blood pressures ($p < .01$) and demonstrated better UBF ($p < .05$). Males had a lower percentage body fat ($p < .001$).

Physical test and self-report comparisons between individuals with acceptable health literacy (REALM-R > 6 , $N = 45$), and those with low health literacy (REALM-R ≤ 6 , $N = 54$) are presented in Table 3. The acceptable health literacy group had more years of education ($p < .001$) and a lower resting heart rate ($p < .05$). The low health literacy group had better upper body flexibility ($p < .05$).

Table 4 shows Pearson (Spearman) correlations between the SRFit categorical and Senior Fitness Test continuous variables for males, females, blacks, whites, low health literacy, and acceptable health literacy subgroups. All SRFit and Senior Fitness Test associations were moderate to very strong,^{41,42} most notably, SRFit BC summary scores and measured percentage body fat correlations ranged from .68 (.70) to .79 (.77) and SRFit BC summary scores and BMI correlations ranged from .72 (.80) to .79 (.85).

DISCUSSION

This is one of the few studies to compare fitness measures between black and white races, male and female genders, and high and low health literacy subgroups. Our findings were generally consistent with results reported in those few prior studies (e.g., males were stronger than females, females were more flexible than males, and men had less body fat than women).^{43–46} To our knowledge, the SRFit survey is the first survey instrument that captures health-related fitness across all physical fitness domains. Self-report data from the SRFit survey were generally consistent with the physical test results. In the current study we also evaluated whether SRFit concurrent criterion validity was maintained when race, gender, and health literacy were compared in patients from a CHC. The validity of such measures within groups at higher risk of fitness-related illness is particularly critical to assessing the clinical, scientific, and public health value of these instruments. Study results demonstrate evidence of validity in self-reported physical fitness for each of the subgroups. This supports the usefulness of the SRFit survey among diverse groups.

Blacks, whites, males, and females had correlations that were generally similar in both self-reported and measured fitness. Also, correlations between the SRFit survey and the Senior Fitness Test did not differ greatly between low and acceptable health literacy groups. Of the 84 correlations between the physical test and self-report measures, all associations were moderate to very strong.^{41,42} Among all groups, the strongest correlations occurred within the BC and BMI measures. These findings are inconsistent with previous literature that

indicates weight misperception and bias in self-reported height and weight are common and vary across subgroups.^{29,30} The SRFit survey queries responders to estimate body fat percentage and BMI but does not specifically ask them to report their height or weight. It is possible that individuals are more willing or better able to accurately report body fat percentage and BMI because there are less salient social norms about general physical fitness than about weight. Also, SRFit offers multiple response options with descriptions, which may improve the responder's reporting accuracy.

The sample includes participants from a single, large, urban location in the United States who are similar in terms of age, education, and physical fitness level. Participants also reported English as their primary language. It is unknown whether SRFit is appropriate for individuals who represent other races (other than black or white) or different age groups, have greater or lesser physical capabilities, or reside outside of U.S. urban areas. The survey was delivered in a fitness center by trained research personnel. Either could have influenced responses. The usefulness of this survey is limited to black and white adults who are 40 years of age and older. The SRFit survey presently cannot be generalized to other race or age groups. The value of the survey when delivered among different populations, in a different location, self-administered, or not delivered in person is unknown. Lastly, there were 25 participants in each subgroup, except white men, which had 26 participants. This is a relatively small sample size, and larger samples that allow further evaluation among these and other subgroups will be necessary to establish broad validity.

The need for standardized measurement methodologies to evaluate physical activity and physical fitness data in order to identify factors related to chronic disease outcomes among population subgroups is supported. In fact, a panel of content experts recently recommended a combination of valid and reliable physical activity surveys and physical fitness measures that could be used in order to compare data across research studies completed by scientists from a variety of disciplines. They suggest doing so would both improve the statistical power needed to make such comparisons and potentially address unanswered scientific questions related to physical activity, physical fitness, and their influences on health and disease status.²⁷

Further validation of the SRFit survey could provide an effective way of identifying groups at high risk of low physical fitness, which is critical to improving the efficiency of health promotion efforts. SRFit survey use would not be limited to physicians. Other health care providers could use SRFit to deliver tailored education and behavior recommendations. The practicality of SRFit could also make the survey particularly valuable to mail, telephone, and Internet-based population surveillance and interventions. The health monitoring of large groups requires the use of self-report measures because they are less expensive and can be widely distributed. The value of a survey depends, of course, not just on its ease of use but also on its validity, including validity in key subgroups.

The small sample size of the current study prevented more sophisticated analytic approaches to assessing sensitivity, specificity, and differential validity. Future studies will expand on the current work with larger samples. Future work also will involve a Spanish translation of SRFit and establishment of validity and reliability in both English- and Spanish-speaking

Latino men and women. To further examine SRFit's usefulness, we will test the survey's specificity, sensitivity, predictive validity, and sensitivity to change. Lastly, if SRFit is to be used in population-based research, we acknowledge the need for a fitness survey that is shorter and can be used for all adults. We will create a SRFit Short Form and test the survey's accuracy with adults aged 18 and older. Although SRFit findings are preliminary, they also are quite promising. This early SRFit evaluation demonstrates general concurrent criterion validity and could be helpful in identifying fitness levels in black and white men and women with low to acceptable health literacy.^{9,25}

Acknowledgments

The project described was supported by award number K01HL096423 from the National Heart, Lung, and Blood Institute and P30 AG024967 from the National Institute on Aging. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Heart, Lung, and Blood Institute or the National Institute on Aging.

References

1. Donnelly JE, Blair SN, Jakicic JM, et al. American College of Sports Medicine Position Stand. Appropriate physical activity intervention strategies for weight loss and prevention of weight regain for adults. *Med Sci Sports Exerc.* 2009; 41:459–471. [PubMed: 19127177]
2. Jurca R, Lamonte MJ, Church TS, et al. Associations of muscle strength and fitness with metabolic syndrome in men. *Med Sci Sports Exerc.* 2004; 36:1301–1307. [PubMed: 15292736]
3. Church TS, Kuk JL, Ross R, et al. Association of cardiorespiratory fitness, body mass index, and waist circumference to nonalcoholic fatty liver disease. *Gastroenterology.* 2006; 130:2023–2030. [PubMed: 16762625]
4. Hooker SP, Sui X, Colabianchi N, et al. Cardiorespiratory fitness as a predictor of fatal and nonfatal stroke in asymptomatic women and men. *Stroke.* 2008; 39:2950–2957. [PubMed: 18688008]
5. Ainsworth BE, Macera CA, Jones DA, et al. Comparison of the 2001 BRFSS and the IPAQ Physical Activity Questionnaires. *Med Sci Sports Exerc.* 2006; 38:1584–1592. [PubMed: 16960519]
6. Young DR, Jee SH, Appel LJ. A comparison of the Yale Physical Activity Survey with other physical activity measures. *Med Sci Sports Exerc.* 2001; 33:955–961. [PubMed: 11404661]
7. Harada ND, Chiu V, King AC, Stewart AL. An evaluation of three self-report physical activity instruments for older adults. *Med Sci Sports Exerc.* 2001; 33:962–970. [PubMed: 11404662]
8. Bonnefoy M, Normand S, Pachiadi C, et al. Simultaneous validation of ten physical activity questionnaires in older men: a doubly labeled water study. *J Am Geriatr Soc.* 2001; 49:28–35. [PubMed: 11207839]
9. Keith NR, Stump TE, Clark DO. Developing a self-reported physical fitness survey. *Med Sci Sports Exerc.* 2012; 44:1388–1394. [PubMed: 22297807]
10. Weening-Dijksterhuis E, de Greef MH, Krijnen W, van der Schans CP. Self-reported physical fitness in frail older persons: reliability and validity of the self-assessment of physical fitness (SAPF) 1. Percept Mot Skills. 2012; 115:797–810. [PubMed: 23409594]
11. Haskell WL. Physical activity by self-report: a brief history and future issues. *J Phys Act Health.* 2012; 9(suppl 1):S5–S10. [PubMed: 22287448]
12. Fuller-Thomson E, Nuru-Jeter A, Minkler M, Guralnik JM. Black-white disparities in disability among older Americans: further untangling the role of race and socioeconomic status. *J Aging Health.* 2009; 21:677–698. [PubMed: 19584411]
13. Kumanyika SK, Yancey AK. Physical activity and health equity: evolving the science. *Am J Health Promot.* 2009; 23:S4–S7. [PubMed: 19601484]
14. Wolf MS, Gazmararian JA, Baker DW. Health literacy and functional health status among older adults. *Arch Intern Med.* 2005; 165:1946–1952. [PubMed: 16186463]

15. He XZ, Baker DW. Body mass index, physical activity, and the risk of decline in overall health and physical functioning in late middle age. *Am J Public Health*. 2004; 94:1567–1573. [PubMed: 15333316]
16. Blair SN, Kohl HW, Barlow CE, et al. Changes in physical fitness and all-cause mortality. *JAMA*. 1995; 273:1093. [PubMed: 7707596]
17. Chodzko-Zajko WJ, Proctor DN, Singh MAF, et al. Exercise and physical activity for older adults. *Med Sci Sports Exerc*. 2009; 41:1510–1530. [PubMed: 19516148]
18. Rejeski WJ, Marsh AP, Chmelo E, et al. The Lifestyle Interventions and Independence for Elders Pilot (LIFE-P): 2-year follow-up. *J Gerontol A Biol Sci Med Sci*. 2009; 64:462–467. [PubMed: 19181715]
19. Morey MC, Pieper CF, Cornoni-Huntley J. Physical fitness and functional limitations in community-dwelling older adults. *Med Sci Sports Exerc*. 1998; 30:715. [PubMed: 9588614]
20. Gabriel, K.; Pettee, K.; Morrow, J. A framework for physical activity as a complex and multidimensional behavior. Paper presented at: Measurement of Active and Sedentary Behaviors: Closing the Gaps in Self-Report Methods, National Institutes of Health Workshop; Bethesda, Md. Jul 22–23. 2010
21. Brownson RC, Fielding JE, Maylahn CM. Evidence-based public health: a fundamental concept for public health practice. *Annu Rev Public Health*. 2009; 30:175–201. [PubMed: 19296775]
22. Pate RR. The evolving definition of physical fitness. *Quest*. 1988; 40:174–179.
23. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep*. 1985; 100:126. [PubMed: 3920711]
24. Kohl HW, Blair SN, Paffenbarger RS, et al. A mail survey of physical activity habits as related to measured physical fitness. *Am J Epidemiol*. 1988; 127:1228–1239. [PubMed: 3369421]
25. Keith NR, Clark DO, Stump TE, Miller DK, Callahan CM. Validity and reliability of the Self-Reported Physical Fitness (SRFit) Survey. *J Phys Act Health*. 2013 published online ahead of print May 10, 2013.
26. Wilson PWF, Paffenbarger RS, Morris JN, Havlik RJ. Assessment methods for physical activity and physical fitness in population studies: report of a NHLBI workshop. *Am Heart J*. 1986; 111:1177–1192. [PubMed: 3716991]
27. Haskell WL, Troiano RP, Hammond JA, et al. Physical activity and physical fitness: standardizing assessment with the PhenX Toolkit. *Am J Prev Med*. May.2012 42:486–492. [PubMed: 22516489]
28. Dorsey RR, Eberhardt MS, Ogden CL. Racial/ethnic differences in weight perception. *Obesity*. 2009; 17:790–795. [PubMed: 19148119]
29. Ezzati M, Martin H, Skjold S, et al. Trends in national and state-level obesity in the USA after correction for self-report bias: analysis of health surveys. *J R Soc Med*. 2006; 99:250–257. [PubMed: 16672759]
30. Gorber SC, Tremblay M, Moher D, Gorber B. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. *Obes Rev*. 2007; 8:307–326. [PubMed: 17578381]
31. Kickbusch IS. Health literacy: addressing the health and education divide. *Health Promot Int*. 2001; 16:289–297. [PubMed: 11509466]
32. Mancuso CA, Rincon M. Asthma patients' assessments of health care and medical decision making: the role of health literacy. *J Asthma*. 2006; 43:41–44. [PubMed: 16448964]
33. Pfeiffer E. A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *J Am Geriatr Soc*. 1975; 23:433. [PubMed: 1159263]
34. Franklin BA, Whaley MH, Howley ET. ACSM's guidelines for exercise testing and prescription, sixth edition. *Nutr Clin Care*. 2001; 4:49–50.
35. Bass PF, Wilson JF, Griffith CH. A shortened instrument for literacy screening. *J Gen Intern Med*. 2003; 18:1036–1038. [PubMed: 14687263]
36. Rikli, R.; Jones, J. American College of Sports Medicine: Senior Fitness Test Manual. Human Kinetics; Champaign, Ill: 2001. p. 43

37. Siri WE. Body composition from fluid spaces and density: analysis of methods. *Tech Measuring Body Composition*. 1961; 61:223–244.
38. Schutte JE, Townsend EJ, Hugg J, et al. Density of lean body mass is greater in blacks than in whites. *J Appl Physiol*. 1984; 56:1647–1649. [PubMed: 6735823]
39. Rikli, RE.; Jones, CJ. *Senior Fitness Test Manual*. Human Kinetics; Champaign, Ill: 2000.
40. Pescatello, LS.; Riebe, D. *ACSM's Guidelines for Exercise Testing and Prescription the Ninth Edition—A Preview*. Lippincott, Williams, and Wilkins; Baltimore, Md: 2013.
41. Kotrlik JW, Williams HA. The incorporation of effect size in information technology, learning, and performance research and performance research. *Inf Technol Learn Perform J*. 2003; 21:1–7.
42. Primer AP. Quantitative methods in psychology. *Psychol Bull*. 1992; 112:155–159. [PubMed: 19565683]
43. Whitt-Glover MC, Kumanyika SK. Systematic review of interventions to increase physical activity and physical fitness in African-Americans. *Am J Health Promot*. 2009; 23:33–56.
44. Gallagher D, Heymsfield SB, Heo M, et al. Healthy percentage body fat ranges: an approach for developing guidelines based on body mass index. *Am J Clin Nutr*. 2000; 72:694–701. [PubMed: 10966886]
45. Soucie J, Wang C, Forsyth A, et al. Range of motion measurements: reference values and a database for comparison studies. *Haemophilia*. 2011; 17:500–507. [PubMed: 21070485]
46. Chen H-T, Lin C-H, Yu L-H. Normative physical fitness scores for community-dwelling older adults. *J Nurs Res*. 2009; 17:30–41. [PubMed: 19352227]

SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Physical fitness is one of few known modifiable paths to healthy aging, and has been shown to lead to a compression of morbidity, improved physical function, and disability prevention. For decades, developing measures to assess fitness has been a priority of health-related organizations such as the National Heart, Lung, and Blood Institute. The potential of implementing fitness measures on a large scale could be meaningful to research, population surveillance, and health care. For example, randomized trials oriented to health promotion and disease prevention could consider using a fitness survey as either a process measure or secondary outcome. In the primary care setting, a fitness survey would allow the physician or other health care provider to give patients tailored information regarding fitness. In population health assessments, a fitness survey instrument would provide increased specificity regarding health disparities between groups and allow surveillance of fitness over time.

What does this article add?

Despite its critical role to physical health, physical fitness measurement remains expensive and time consuming. Accessing the expertise, space, and/or equipment needed to perform fitness tests is difficult. The Self-Reported Fitness (SRFit) survey measures physical fitness across all health-related fitness domains in adults age 40 or older, requires 10 minutes or less to complete, and initially shows construct validity in reference to surveys of theoretically related measures and good internal consistency and concurrent validity in reference to all fitness measures and across black and white race, gender, and health literacy subgroups.

What are the implications for health promotion practice or research?

This simple and inexpensive alternative physical fitness measure could be used in clinical settings to inform clinicians about their patients' fitness status before fitness declines negatively impact physical function or general health. In research, the SRFit survey could be a useful alternative when time, space, expertise, or funding is not adequate to facilitate physical testing. In the health/fitness setting, the survey could be used as a screener to inform the health/fitness professional about the client's baseline fitness information prior to a fitness assessment or exercise training program. The SRFit survey could be a useful tool to inform physical activity counseling and interventions and to delay functional decline.

Table 1 Race-Specific Means and Standard Deviations for Physical Test and Self-Report Measures (N = 101)[†]

Variable	Race [‡]		<i>F</i>	<i>p</i> [§]
	White (N = 51)	Black (N = 50)		
Demographics				
Age, y	51; 55.1 (8.2)	50; 53.6 (8.0)	0.85	0.3576
Education, y	51; 12.1 (3.1)	50; 12.2 (1.7)	0.03	0.8545
REALM score	49; 5.8 (1.8)	50; 4.4 (2.7)	9.44	0.0028*
SRFit self-report measures				
Lower body strength	45; 11.7 (3.1)	38; 11.3 (2.9)	0.42	0.5202
Upper body strength	45; 11.6 (3.1)	42; 11.4 (2.8)	0.10	0.7545
Cardiovascular	41; 11.8 (2.8)	37; 11.4 (3.1)	0.37	0.5448
Lower body flexibility	48; 16.0 (4.3)	42; 16.4 (3.9)	0.29	0.5892
Upper body flexibility	49; 23.6 (3.8)	43; 21.9 (5.0)	3.09	0.0822
Body composition	47; 8.5 (2.2)	39; 8.4 (2.5)	0.00	0.9826
Physical test measures				
Resting heart rate, beats/min	51; 77.1 (15.4)	50; 76.0 (12.7)	0.16	0.6917
Systolic BP, mm Hg	51; 129.5 (21.5)	50; 132.6 (19.3)	0.57	0.4520
Diastolic BP, mm Hg	51; 82.6 (10.3)	50; 84.2 (13.7)	0.43	0.5153
% body fat (BodPod)	48; 35.5 (11.9)	45; 37.0 (14.1)	0.32	0.5710
BMI	51; 32.1 (8.0)	50; 34.8 (9.6)	2.43	0.1223
Arm curl, curls in 30 s	51; 15.5 (6.1)	50; 15.8 (5.7)	0.05	0.8250
Chair stand, stands in 30 s	51; 11.2 (4.3)	50; 10.2 (3.6)	1.41	0.2386
Back scratch, cm	51; −19.7 (17.2)	50; −24.1 (17.8)	1.58	0.2118
Chair sit and reach, cm	51; −6.5 (13.6)	50; −7.0 (13.5)	0.03	0.8599
6-min walk, m	51; 410.2 (168.6)	49; 416.6 (169.3)	0.04	0.8498

[†] REALM indicates Rapid Estimate of Adult Literacy in Medicine; SRFit, Self-Reported Fitness survey; BP, blood pressure; and BMI, body mass index.

[‡] In each cell, sample size is shown first followed by mean value with standard deviation in parentheses.

[§] *p* value from overall *F*-test from general linear model.

* *p* < 0.05.

Table 2 Gender-Specific Means and Standard Deviations for Physical Test and Self-Report Measures (N = 101)[†]

Variable	Gender [‡]		<i>F</i>	<i>p</i>
	Male (N = 52)	Female (N = 49)		
Demographics				
Age, y	52; 53.0 (7.3)	49; 55.9 (8.7)	0.41	0.5246
Education, y	52; 12.2 (3.1)	49; 12.1 (1.6)	0.06	0.8091
REALM score	52; 4.6 (2.5)	47; 5.6 (2.1)	4.68	0.0330*
SRFit self-report measures				
Lower body strength	43; 12.4 (2.6)	40; 10.6 (3.1)	7.96	0.0060*
Upper body strength	45; 12.3 (2.6)	42; 10.6 (3.1)	8.54	0.0044*
Cardiovascular	42; 12.6 (2.4)	36; 10.4 (3.0)	12.56	0.0007*
Lower body flexibility	46; 17.2 (4.2)	44; 15.1 (3.7)	6.16	0.0149*
Upper body flexibility	47; 23.3 (4.0)	45; 22.4 (4.9)	0.94	0.3356
Body composition	47; 7.7 (1.9)	39; 9.3 (2.4)	10.77	0.0015*
Physical test measures				
Resting heart rate, beats/min	52; 77.4 (16.1)	49; 75.7 (11.7)	0.35	0.5579
Systolic BP, mm Hg	52; 136.2 (19.4)	49; 125.6 (20.2)	7.25	0.0083*
Diastolic BP, mm Hg	52; 86.3 (13.0)	49; 80.3 (10.2)	6.55	0.0120*
% body fat (BodPod)	49; 29.7 (10.4)	44; 43.4 (11.7)	36.04	<0.0001*
BMI	52; 31.9 (8.4)	49; 35.1 (9.2)	3.43	0.0670
Arm curl, curls in 30 s	52; 17.6 (6.6)	49; 13.5 (4.1)	14.34	0.0003*
Chair stand, stands in 30 s	11.6 (4.4)	9.7 (3.2)	6.46	0.0126*
Chair sit and reach, cm	52; −4.7 (14.0)	49; −8.9 (12.6)	2.57	0.1120
Back scratch, cm	52; −25.4 (17.7)	49; −18.1 (16.7)	4.56	0.0352*
6-min walk, m	51; 453.7 (165.2)	49; 371.3 (162.3)	6.33	0.0135*

[†] REALM indicates Rapid Estimate of Adult Literacy in Medicine; SRFit, Self-Reported Fitness survey; BP, blood pressure; and BMI, body mass index.

[‡] In each cell, sample size is shown first followed by mean value with standard deviation in parentheses.

* $p < 0.05$.

Table 3REALM Subgroup Physical Test and SRFit Measures (N = 99)[†]

	REALM Score [‡]			
Variable	6 (n = 54)	> 6 (n = 45)	F	p
Demographics				
Age, y	54; 53.0 (7.3)	45; 55.9 (8.7)	3.19	0.0772
Education, y	54; 11.4 (2.5)	45; 13.1 (2.2)	12.63	0.0006 [‡]
SRFit self-report measures				
Lower body strength	42; 11.5 (3.2)	39; 11.5 (2.8)	0.00	0.9827
Upper body strength	47; 11.4 (3.0)	42; 11.7 (2.8)	0.19	0.6669
Cardiovascular	39; 11.7 (2.7)	37; 11.7 (3.1)	0.01	0.9168
Lower body flexibility	48; 16.1 (4.1)	40; 16.3 (4.2)	0.09	0.7687
Upper body flexibility	47; 22.0 (4.9)	43; 23.8 (3.8)	3.79	0.0547 [‡]
Body composition	46; 8.2 (2.3)	38; 8.7 (2.3)	0.77	0.3841
Physical test measures				
Resting heart rate, beats/min	54; 79.7 (15.6)	45; 73.0 (11.4)	5.60	0.0200 [‡]
Systolic BP, mm Hg	54; 133.2 (21.4)	45; 129.4 (18.6)	0.89	0.3473
Diastolic BP, mm Hg	54; 85.4 (13.3)	45; 81.6 (10.1)	2.45	0.1210
% body fat (BodPod)	49; 33.7 (12.7)	42; 38.8 (13.0)	3.57	0.0621
BMI	54; 33.3 (8.4)	45; 33.5 (9.6)	0.01	0.9048
Arm curl, curls in 30 s	54; 15.8 (6.0)	45; 15.6 (5.9)	0.02	0.8749
Chair stand, stands in 30 s	54; 10.2 (3.9)	45; 11.2 (4.1)	1.66	0.2010
Chair sit and reach, cm	54; −8.1 (14.0)	45; −4.9 (12.8)	1.36	0.2462
Back scratch, cm	54; −24.4 (19.6)	45; −19.2 (14.4)	2.17	0.1436
6-min walk, m	53; 412.7 (163.1)	45; 412.4 (179.2)	0.00	0.9925

[†] REALM indicates Rapid Estimate of Adult Literacy in Medicine; SRFit, Self-Reported Fitness survey; BP, blood pressure; and BMI, body mass index.

[‡] In each cell, sample size is shown first followed by mean value with standard deviation in parentheses.

* $p < 0.05$.

Table 4

Correlations Between SRFit Domain Summary Scores and Analogous Fitness Tests and REALM-R (N = 101)*

SRFit Domain	Analogous Fitness Test	Males (n = 52)	Females (n = 49)	Blacks (n = 50)	Whites (n = 51)	REALM-R 6 (n = 54)	REALM-R > 6 (n = 45)
Lower-body strength summary	Chair stand	43; 0.67 (0.59)	40; 0.70 (0.66)	38; 0.68 (0.68)	45; 0.69 (0.60)	42; 0.73 (0.64)	39; 0.65 (0.63)
Upper-body strength summary	Biceps curl	45; 0.67 (0.65)	42; 0.40 (0.33)	42; 0.63 (0.61)	45; 0.54 (0.53)	43; 0.58 (0.58)	42; 0.56 (0.54)
Cardiovascular endurance	6-min walk	42; 0.52 (0.41)	36; 0.43 (0.52)	37; 0.45 (0.53)	41; 0.58 (0.47)	39; 0.63 (0.68)	37; 0.45 (0.39)
Lower-body flexibility	Sit and reach	46; 0.60 (0.59)	44; 0.51 (0.53)	42; 0.60 (0.67)	48; 0.56 (0.49)	48; 0.65 (0.66)	40; 0.49 (0.47)
Upper-body flexibility	Back scratch	47; 0.65 (0.68)	45; 0.57 (0.42)	43; 0.59 (0.60)	49; 0.53 (0.36)	47; 0.62 (0.67)	43; 0.50 (0.35)
Body composition	BodPod	44; 0.68 (0.70)	35; 0.79 (0.77)	34; 0.77 (0.78)	45; 0.77 (0.82)	41; 0.77 (0.79)	36; 0.78 (0.79)
	BMI	47; 0.76 (0.85)	39; 0.73 (0.80)	39; 0.79 (0.82)	47; 0.72 (0.82)	46; 0.71 (0.78)	38; 0.79 (0.85)

* In each cell, sample size is shown first followed by Pearson correlation with Spearman correlation in parentheses. SRFit indicates Self-Reported Fitness survey; REALM-R, Rapid Estimate of Adult Literacy in Medicine; and BMI, body mass index.