HHS Public Access

Author manuscript

Geriatr Gerontol Int. Author manuscript; available in PMC 2016 March 17.

Published in final edited form as:

Geriatr Gerontol Int. 2014 October ; 14(4): 864–873. doi:10.1111/ggi.12180.

Validity and applicability of a video-based animated tool to assess mobility in elderly Latin American populations

Ricardo Oliveira Guerra[1], **Bruna Silva Oliveira**[1], **Beatriz Eugenia Alvarado**[2], **Carmen Lucia Curcio**[3], **W Jack Rejeski**[4], **Anthony P Marsh**[4], **Edward H Ip**[4], **Ryan T Barnard**[4], **Jack M Guralnik**[5], and **Maria Victoria Zunzunegui**[6]

[1]Federal University of Rio Grande do Norte, Natal, Brazil

[2]Queen's University, Kingston, Ontario

[3]University of Caldas, Manizales, Colombia

[4]Department of Health and Exercise Science, Wake Forest University, Winston-Salem, North Carolina

[5]School of Medicine, University of Maryland, Baltimore, Maryland, USA

[6]University of Montréal, Montreal, Quebec, Canada

Abstract

Aim—To assess the reliability and the validity of Portuguese- and Spanish-translated versions of the video-based short-form Mobility Assessment Tool in assessing self-reported mobility, and to provide evidence for the applicability of these videos in elderly Latin American populations as a complement to physical performance measures.

Methods—The sample consisted of 300 elderly participants (150 from Brazil, 150 from Colombia) recruited at neighborhood social centers. Mobility was assessed with the Mobility Assessment Tool, and compared with the Short Physical Performance Battery score and self-reported functional limitations. Reliability was calculated using intraclass correlation coefficients. Multiple linear regression analyses were used to assess associations among mobility assessment tools and health, and sociodemographic variables.

Results—A significant gradient of increasing Mobility Assessment Tool score with better physical function was observed for both self-reported and objective measures, and in each city. Associations between self-reported mobility and health were strong, and significant. Mobility Assessment Tool scores were lower in women at both sites. Intraclass correlation coefficients of the Mobility Assessment Tool were 0.94 (95% confidence interval 0.90–0.97) in Brazil and 0.81 (95% confidence interval 0.66–0.91) in Colombia. Mobility Assessment Tool scores were lower in Manizales than in Natal after adjustment by Short Physical Performance Battery, self-rated health and sex.

Correspondence: Dr Ricardo Oliveira Guerra MD PhD, Department of Physiotherapy, Universidade Federal do Rio Grande do Norte, Av Sen. Salgado Filho, 3000 – Campus Universitário, Natal-RN 59078-970, Brazil. roguerra@ufrnet.br.

Disclosure statement

The authors declare no conflict of interest.

Conclusions—These results provide evidence for high reliability and good validity of the Mobility Assessment Tool in its Spanish and Portuguese versions used in Latin American populations. In addition, the Mobility Assessment Tool can detect mobility differences related to environmental features that cannot be captured by objective perfor mance measures.

Keywords

aged; cross-cultural comparison; Latin America; elderly; geriatric assessment; mobility limitation

Introduction

As people age, mobility is important for the preservation of autonomy, independence,[1,2] performance of social roles[2,3] and quality of life.[4] Deficits in mobility are a significant risk factor for disability and care needs;[5–7] thus, instruments that assess mobility in aged individuals are important for clinical practice and epidemiological studies.

Measures of physical performance and self-reporting questionnaires can be used to assess mobility,[8–11] and provide complementary information about the disablement process. Researchers commonly use objective measures, such as the Short Physical Performance Battery (SPPB), to evaluate physical performance because they predict disability, health service utilization, institutionalization, hospitalization, falls and mortality.[8,12–16]

Questionnaires are often used in place of performance measures, although self-reports are subject to substantial measurement error because of individual and cultural differences in respondents' interpretations of task demands.[16,17] Older adults' perceptions of their abilities are known to be equally important in understanding aging outcomes as performance capacities or objective assessments of physical impairment, such as muscular weakness.[18] Bean *et al*. also argued that the importance of performance and self-reported measures in understanding aging outcomes could be related to the natures of the outcomes.[19] In fact, objective performance measures and self-reported measures of mobility are complementary, as self-reported measures of mobility take into account environmental challenges, specific variations of tasks in each context, and individual attributes and health conditions that are not taken into account in objective performance.

Video animation has recently been proposed as a method to assess mobility in elderly individuals. Video has the advantage of providing greater standardization of the meaning inherent in specific item content, because it illustrates the task more clearly. Rejeski *et al*. developed a short form of the Mobility Assessment Tool (MAT-sf) that uses video animation of mobility tasks with graded degrees of difficulty. The original English MAT-sf is a rapid, reliable and valid measure of mobility that can be completed in 5 min, facilitating its use in research and clinical practice.[17]

Most research on the disablement process in aging populations has been carried out in English-speaking North American populations, and is therefore not generalizable to other settings. In elderly populations from seven Latin American cities and Spain, women, respondents with less than primary school education, and respondents perceiving insufficient income were more likely to have mobility limitations, and difficulties in activities of daily

living and instrumental activities of daily living,[20–23] and mobility limitations predicted poor self-rated health (SRH).[24–26]

Valid self-reported measures of mobility are required to examine cross-cultural differences in mobility, as previous research based on simple questionnaires is affected by considerable measurement error.[27] The aim of the present study was to translate the video-based MAT from English to Portuguese and Spanish, and to examine its test–retest reliability, and concurrent and construct validity by comparing it with objective physical performance and self-reported measures of mobility and health among community-dwelling older adults in the Andean region of Colombia and the northeast coast of Brazil. It was hypothesized that self-reported mobility reported on the MAT-sf would correlate with measures for which validity has already been established as the SPPB and self-reported of functional limitations. A second objective was to assess the complementary nature of the MAT-sf and the physical performance assessment.

Methods

Study sites and participants

Data were collected in the coastal city of Natal (Brazil) and the Andean city of Manizales (Colombia). A total of 150 participants (75 men, 75 women) aged 65–74 years were recruited at senior centers, which serve as meeting points for individuals of this age. This age group was targeted because this validation study was carried out to prepare for an international longitudinal study of mobility in aging that will follow people who are aged 65–74 years at baseline. All included participants were able to walk without help, either with or without the use of an assistive device. Older adults with four or more errors in the orientation section of the Leganes Cognitive Test (LCT)[28,29] were excluded. As both LCT and MAT-sf required a certain level of visual acuity, we asked “How do you see? Excellent, good, fair, bad or very bad?”, and nobody was excluded for very bad vision.

Before initiating data collection, researchers explained the aims of the study to coordinators of the senior centers, and requested their permission to collect data. Although we obtained convenience samples of volunteers, response rates were very high; more than 90% of those invited agreed to participate in the study. The procedures and objectives of the interview were explained. Participants gave written informed consent or verbal consent, in case of illiteracy. The study was approved by the ethics committees of each institution (Universidad de Caldas/Colombia and Universidade Federal do Rio Grande do Norte/Brazil). Trained interviewers administered the MAT-sf and questionnaires.

Study variables

Mobility assessment—The MAT-sf is composed of a series of 10 video clips representing mobility tasks with different degrees of difficulty.[17] We developed the Portuguese and Spanish versions of the MAT-sf in collaboration with the investigators who originally designed and validated the English version. Content and translation equivalence among the English, Portuguese and Spanish versions was established, leading to a Latin

American short version comprising 12 video clips. Two videos were added to the original version to cover walking speeds likely to be common among Latin American participants.

The following questions were asked: (i) “For how many minutes could you walk on flat terrain at the pace shown?”; (ii) “For how many minutes could you walk rapidly on flat terrain at the pace shown?”; (iii) “For how many minutes you could run on flat terrain at the pace shown?”; (iv) “How many times, without stopping, could you walk up this slope using the handrail at the pace shown?”; (v) “How many times, without stopping, could you walk up this ramp without using the handrail at the pace shown?”; (vi) “Could you go over a series of low barriers at the pace shown?”; (vii) “Could you walk up a hill covered with stones at the pace shown?”; (viii) “For how many minutes could you walk rapidly, without stopping, up a hill covered with stones at the pace shown?”; (ix) “Could you climb three steps using the handrail at the pace shown?”; (x) “Could you go down three steps without using the handrail at the pace shown?”; (xi) “Could you go up three steps without using the handrail and carrying a light bag, as shown?”; and (xii) “Could you climb nine steps carrying two light bags, as shown?”. A demonstration of the instrument and responses to questions can be found at the following website: http://mat-sf.wfuhs.arane.us/. The program automatically calculated each MAT-sf item score for each response pattern. The scoring algorithm was based on item response theory, which takes into account the difficulty levels of different questions. The scores were scaled to have a mean of 50 and standard deviation of 10 in the original USA development sample. The range of scores in the Latin American samples was 36.2–73.1, with higher scores representing better mobility.[17]

Objective physical performance—The SPPB uses three tests to analyze physical performance: balance, walking and chair standing. Each test is scored from 0 and 4, and the final score is the sum of the three test scores (0–12), with higher scores reflecting better physical function,[8] and good reliability and validity in elderly populations.[8,30,31] The SPPB score was categorized as 8 or less, 8–10 and 11–12 for the validity assessment.

Functional limitations—We used seven items proposed by Nagi[11] to determine whether participants had lower- or upper-extremity difficulties when carrying out the following tasks: “moving a large object such as a chair, raising their arms above their head, grasping or handling small objects with their fingers, kneeling/stooping/crouching, lifting and carrying 10 pounds, climbing 10 steps without tiring and walking 400 m”. The number of tasks in which the participant had difficulties was summed and used as a continuous variable in the analyses. Functional limitations were also categorized as none, 1–3 and 4–7 for the validity assessment.

Covariates measured

Health status—SRH was assessed by the following question: “Would you say your health is excellent, very good, fair, poor or very poor?” For analysis, responses were recoded into three categories: good, fair and poor. This questionnaire has been shown to be a valid indicator of health status.[32–34]

Sociodemographic variables—The structured questionnaire administered to participants included information on age, sex, marital status, education (ability to read and write, years of education) and sufficiency of income, assessed by the following question: "To what extent is your income sufficient to meet your needs?" Participants responded "very sufficient," "sufficient" "insufficient" and "very insufficient".

Reliability of mobility assessment

Test–retest reliability of the instrument was estimated by reassessing 40 individuals residing in Natal 14 days after initial evaluation, and 39 participants from Manizales 7–10 days (mean 8 days) after initial assessment. Reassessments were carried out by the same interviewer.

Data analysis

Descriptive statistics were used to summarize information on the sample in Natal and Manizales. Intraclass correlation coefficients (ICC) were used to measure test–retest reliability.

For the first objective, providing evidence on the validity of MAT-sf in the two study samples, ANOVA and multiple linear regression analyses were carried out to assess the validity, using MAT-sf score as the dependent variable and measures of physical performance, and functional limitations as independent variables.

For the second objective, assessing the complementary nature of self-reported mobility and objective physical performance, a multiple linear regression was carried out to examine if there was a significant difference in MAT-sf between cities, after adjustment for objective physical performance, SRH and sex. A signifi-cant difference in MAT-sf between cities after this adjustment would indicate that MAT-sf is sensitive to environmental features of the city independently of the objective physical performance measure. Bivariate analyses were used to examine associations between MAT-sf and sociodemographic variables and SRH. Two multiple linear regression models were fitted. Model I included SRH, city, and sex to assess if association between MAT-sf and these covariates were in the expected direction: higher mobility in those with good SRH and men. In model II, we added SPPB to assess if those known covariates were able to explain self-reported mobility beyond physical performance. All variables associated significantly ($P < 0.05$) with the MAT-sf score were retained in the final model. SPSS software (version 17.0; SPSS, Chicago, IL, USA) was used to store and process data.

Results

The sample consisted of 300 elderly participants (150 from Natal, 150 from Manizales). Table 1 shows the descriptive analysis of all sample variables in both cities. SRH was worse in Natal than in Manizales; 49.3% of participants in Manizales and 13.3% in Natal reported being in good health. Despite this difference, MAT-sf scores were practically identical: 60.7 and 60.6 in Natal and Manizales, respectively.

Elderly participants could complete the test readily and rapidly (within <10 min at both sites). Figures 1–4 show screenshots and graphics of responses for items of the MAT-sf in Natal and Manizales. Test–retest reliability for the MAT-sf was very good in both cities. ICC were 0.94 (95% confidence interval [CI] 0.90–0.97) in Natal and 0.81 (95% CI 0.66–0.91) in Manizales.

MAT-sf scores in Manizales and Natal were higher in men than in women ($P \leq 0.01$; see Table 2). A positive gradient between MAT-sf score and SRH was observed in Natal and Manizales ($P \leq 0.001$). However, for each SRH level, the MAT-sf score was three to four points higher in Natal than in Manizales: among those reporting good health, MAT-sf scores were 65.9 in Natal and 62.9 in Manizales; among those with fair health, scores were 63.7 in Natal and 59.2 in Manizales; for those with poor health, scores were 57.4 in Natal and 53.8 in Manizales.

In Table 3, the mean MAT-sf scores are shown by categories of functional limitations and SPPB. A significant gradient of increasing MAT-sf score with better physical function is observed for both self-reported and objective measures, and in each city.

In Table 4, the linear regressions of MAT-sf scores on the number of physical limitations and the SPPB score are shown. Significant coefficients are observed for both the self-reported and the objective physical function measures. The multiple regression coefficient is similar in both cities and, as expected, larger for the self-reported measure of the number of physical limitations than for the objective physical performance.

Table 5 shows the results of multivariate regression analyses including health status, research site and sex, and the objective measure of physical function. After adjustment for objective physical performance, a positive gradient between MAT-sf score and SRH was observed. Controlling for physical performance, SRH and sex resulted in a score of MAT-sf, which was on average 3.68 higher in the Natal sample compared with the Manizales sample, whereas bivariate analyses showed no difference in MAT-sf score between cities.

Regression analyses in which the objective physical performance score, the SPPB, was a dependent variable showed no significant difference in SPPB score between cities (results not shown). Thus, although the MAT-sf was capable of detecting lower mobility in the Manizales sample compared with the Natal sample, this difference was not reflected in the objective performance measure.

Discussion

Cross-national research data are required to understand the factors explaining differences in mobility disability across societies. Some of these factors are related to individual physical performance for any given task, whereas others are related to the demands of the physical environments in which different populations live. The present study examined associations between MAT-sf scores, and objective physical performance and self-reported mobility and health in two environmentally, culturally, and geographically diverse cities in Brazil and Colombia. The present results suggest that MAT-sf, as a measure of self-reported mobility,

and performance measures are complementary in the examination of physical function in older individuals, because they independently contribute to explaining mobility.

Our first step in the validation of MAT-sf was the assessment of the cultural appropriateness of the videos, which should be relevant to older adults in Brazil and Colombia. The Portuguese and Spanish versions of the instrument were developed, reliability was estimated and validity was assessed. A linguistic translation was required as cultural and social context were different from the original study, carried out among English-speaking Americans. After completion of the translation and cultural adaptation phases, the MAT-sf contained 12 video clips with simple and clear language, maintaining cross-cultural equivalence

ICC values obtained in both locations showed very good test–retest reliability for the Spanish and Portuguese versions of the MAT-sf. Rejeski *et al*. obtained similar results in the initial development of the English MAT-sf (ICC = 0.93). Given that the MAT-sf was designed to standardize and facilitate understanding of mobility-related questions, it was not surprising that the instrument was well accepted and understood, and readily and rapidly applied at both study sites. Indeed, the MAT-sf is a self-reported measure and asks for self-evaluations, but it provides a view of the tasks, presentation and description of the movements.

One methodological difference, however, must be mentioned: in Colombia and Brazil, the instrument was administered by a trained interviewer capable of explaining the MAT-sf to elderly participants and recording their responses. In contrast to the American version, the MAT-sf could not be completely self-administered because most of our participants were unable to use a computer.

The associations with SPPB and functional limitations support the validity of MAT-sf. The negative correlations between MAT-sf scores and self-reported functional limitations show that people with functional limitations had low MAT-sf scores. Having no lower-or upper-extremity difficulties is associated with the ability to carry out mobility tasks as those questioned in MAT-sf. Similarly, those in the highest range of function according to the SPPB have the highest MAT-sf scores.

The present results clearly show the complementary nature of physical performance and mobility assessments. In adjusted analyses, elderly participants living in Manizales had lower MAT-sf scores than those in Natal, whereas SPPB scores did not differ between cities. The two research sites differ markedly. In both cities, most elderly people do not own cars, and walking is the most common form of transportation. However, Manizales is located in the Andean Mountains, and presents many environmental challenges to mobility, such as steep streets, stairs and obstacles due to cracked pavements. Rain occurs frequently, and the streets become slippery with water and mud. In contrast, Natal is a coastal city on flat terrain, with no slope and few stairs or obstacles to walking. These environmental differences might have influenced participants' self-reported mobility. Participants in Manizales reported better health than those in Natal, but for the same level of health, those in Manizales systematically reported significantly lower mobility than those in Natal. This poorer mobility in Manizales could be due to the increased number of mobility challenges in

everyday life, which led participants to perceive mobility limitations more clearly, despite reporting better health than did participants in Natal. These findings show that the MAT-sf is capable of detecting differences in mobility disability beyond those identified by objective physical assessment.

The present results showed better self-reported mobility in men than in women in both cities. These patterns corroborate previous findings in Latin American populations.[35]

Potential limitations of the present study are related to the sample characteristics. The participants were young older adults, and do not represent a broad age spectrum of older adults. In addition, the volunteer nature of participation and the recruitment sites limit the generalizability of the results and external validity.

The MAT-sf is an acceptable, reliable and valid tool to assess mobility in community samples of elderly people in diverse contexts. In addition, the MAT-sf offers a complement to objective physical performance assessments because it is able to capture population differences in mobility that are independent of health status and sex.

Acknowledgements

This manuscript was prepared by the International Mobility in Aging Study (IMIAS) research group on mobility decline in the elderly populations of four countries (Canada, Colombia, Albania and Brazil) funded by the Canadian Institutes of Health. We thank the IMIAS group for their support in manuscript development. This team is composed of researchers and community partners from: Kingston, Ontario; St Hyacinth, Quebec; Natal, Brazil; and Manizales, Colombia.

References

1. Hirvensalo M, Rantanen T, Heikkinen E. Mobility difficulties and physical activity as predictors of mortality and loss of independence in the community-living older population. J Am Geriatr Soc. 2000; 48:493–498. [PubMed: 10811541]
2. Johnson CS, Mahon A, McLeod W. Nutritional, functional and psychosocial correlates of disability among older adults. J Nutr Health Aging. 2006; 10:45–50. [PubMed: 16453057]
3. Jette AM. Toward a common language for function, disability, and health. Phys Ther. 2006; 86:726–734. [PubMed: 16649895]
4. Rejeski WJ, Mihalko SL. Physical activity and quality of life in older adults. J Gerontol A Biol Sci Med Sci. 2001; 56:23–35. [PubMed: 11730235]
5. Guralnik JM, Ferrucci L, Balfour JL, Volpato S, Di Iorio A. Progressive versus catastrophic loss of the ability to walk: implications for the prevention of mobility loss. J Am Geriatr Soc. 2001; 49:1463–1470. [PubMed: 11890584]
6. Inouye SK, Wagner DR, Acampora D, Horwitz RI, Cooney LM Jr, Tinetii ME. A controlled trial of a nursing-centered intervention in hospitalized elderly medical patients: the Yale Geriatric Care Program. J Am Geriatr Soc. 1993; 41:1353–1360. [PubMed: 8227919]
7. Hardy SE, Kang Y, Studenski SA, Degenholtz HB. Ability to walk 1/4 mile predicts subsequent disability, mortality, and health care costs. J Gen Intern Med. 2011; 26:130–135. [PubMed: 20972641]
8. Guralnik JM, Simonsick EM, Ferrucci L, et al. A short physical performance battery assessing lower extremity function: association with self-reported disability and prediction of mortality and nursing home admission. J Gerontol. 1994; 49:M85–M94. [PubMed: 8126356]
9. Katz S, Downs TD, Cash HR, Grotz RC. Progress in development of the index of ADL. Gerontologist. 1970; 10:20–30. [PubMed: 5420677]

10. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist. 1969; 9:179–186. [PubMed: 5349366]
11. Nagi SZ. An epidemiology of disability among adults in the United States. Milbank Mem Fund Q Health Soc. 1976; 54:439–467. [PubMed: 137366]
12. Onder G, Penninx BW, Ferrucci L, Fried LP, Guralnik JM, Pahor M. Measures of physical performance and risk for progressive and catastrophic disability: results from the Women's Health and Aging Study. J Gerontol A Biol Sci Med Sci. 2005; 60:74–79. [PubMed: 15741286]
13. Studenski S, Perera S, Wallace D, et al. Physical performance measures in the clinical setting. J Am Geriatr Soc. 2003; 51:314–322. [PubMed: 12588574]
14. Vasunilashorn S, Coppin AK, Patel KV, et al. Use of the Short Physical Performance Battery Score to predict loss of ability to walk 400 meters: analysis from the InCHIANTI study. J Gerontol A Biol Sci Med Sci. 2009; 64:223–229. [PubMed: 19182232]
15. Wennie Huang WN, Perera S, VanSwearingen J, Studenski S. Performance measures predict onset of activity of daily living difficulty in community-dwelling older adults. J Am Geriatr Soc. 2010; 58:844–852. [PubMed: 20406319]
16. Marsh AP, Ip EH, Barnard RT, Wong YL, Rejeski WJ. Using video animation to assess mobility in older adults. J Gerontol A Biol Sci Med Sci. 2010; 66:217–227. [PubMed: 21127192]
17. Rejeski WJ, Ip EH, Marsh AP, Barnard RT. Development and validation of a video-animated tool for assessing mobility. J Gerontol A Biol Sci Med Sci. 2010; 65:664–671. [PubMed: 20403946]
18. Rejeski WJ, Miller ME, Foy C, Messier S, Rapp S. Self-efficacy and the progression of functional limitations and self-reported disability in older adults with knee pain. J Gerontol B Psychol Sci Soc Sci. 2001; 56:S261–S265. [PubMed: 11522807]
19. Bean JF, Olveczky DD, Kiely DK, LaRose SI, Jette AM. Performance-based versus patient-reported physical function: what are the underlying predictors? Phys Ther. 2011; 91:1804–1811. [PubMed: 22003163]
20. Alcala MV, Puime AO, Santos MT, Barral AG, Montalvo JI, Zunzunegui MV. Prevalence of frailty in an elderly Spanish urban population. Relationship with comorbidity and disability. Aten Primaria. 2010; 42:520–527. [PubMed: 20116137]
21. Alvarado BE, Guerra RO, Zunzunegui MV. Gender differences in lower extremity function in Latin American elders: seeking explanations from a life-course perspective. J Aging Health. 2007; 19:1004–1024. [PubMed: 18165293]
22. Fernandez-Bolanos M, Otero A, Zunzunegui MV, et al. Sex differences in the prevalence of frailty in a population aged 75 and older in Spain. J Am Geriatr Soc. 2008; 56:2370–2371. [PubMed: 19093952]
23. Guerra RO, Alvarado BE, Zunzunegui MV. Life course, gender and ethnic inequalities in functional disability in a Brazilian urban elderly population. Aging Clin Exp Res. 2008; 20:53–61. [PubMed: 18283229]
24. Alves LC, Rodrigues RN. Determinants of self-rated health among elderly persons in Sao Paulo, Brazil. Rev Panam Salud Publica. 2005; 17:333–341. [PubMed: 16053643]
25. Sirola J, Tuppurainen M, Rikkonen T, Honkanen R, Koivumaa-Honkanen H, Kroger H. Correlates and predictors of self-rated health and ambulatory status among elderly women – Cross-sectional and 10 years population-based cohort study. Maturitas. 2010; 65:244–252. [PubMed: 20018468]
26. Sun W, Watanabe M, Tanimoto Y, et al. Factors associated with good self-rated health of non-disabled elderly living alone in Japan: a cross-sectional study. BMC Public Health. 2007; 7:297. [PubMed: 17949511]
27. Saloman JA, Tandon A, Murray CJ. Comparability of self rated health: cross sectional multi-country survey using anchoring vignettes. BMJ. 2004; 328:258. [PubMed: 14742348]
28. Caldas VV, Zunzunegui MV, Freire Ado N, Guerra RO. Translation, cultural adaptation and psychometric evaluation of the Leganes cognitive test in a low educated elderly Brazilian population. Arq Neuropsiquiatr. 2012; 70:22–27. [PubMed: 22218469]
29. De Yebenes MJ, Otero A, Zunzunegui MV, Rodriguez-Laso A, Sanchez-Sanchez F, Del Ser T. Validation of a short cognitive tool for the screening of dementia in elderly people with low educational level. Int J Geriatr Psychiatry. 2003; 18:925–936. [PubMed: 14533125]

30. Freire AN, Guerra RO, Alvarado B, Guralnik JM, Zunzunegui MV. Validity and reliability of the short physical performance battery in two diverse older adult populations in Quebec and Brazil. J Aging Health. 2012; 24:863–878. [PubMed: 22422762]

31. Ostir GV, Volpato S, Fried LP, Chaves P, Guralnik JM. Reliability and sensitivity to change assessed for a summary measure of lower body function: results from the Women's Health and Aging Study. J Clin Epidemiol. 2002; 55:916–921. [PubMed: 12393080]

32. Lee Y. The predictive value of self assessed general, physical, and mental health on functional decline and mortality in older adults. J Epidemiol Community Health. 2000; 54:123–129. [PubMed: 10715745]

33. Ware JE Jr, Gandek B. Overview of the SF-36 Health Survey and the International Quality of Life Assessment (IQOLA) Project. J Clin Epidemiol. 1998; 51:903–912. [PubMed: 9817107]

34. Wong R, Pelaez M, Palloni A. [Self-reported general health in older adults in Latin America and the Caribbean: usefulness of the indicator]. Rev Panam Salud Publica. 2005; 17:323–332. [PubMed: 16053642]

35. Zunzunegui MV, Alvarado BE, Beland F, Vissandjee B. Explaining health differences between men and women in later life: a cross-city comparison in Latin America and the Caribbean. Soc Sci Med. 2009; 68:235–242. [PubMed: 19036488]

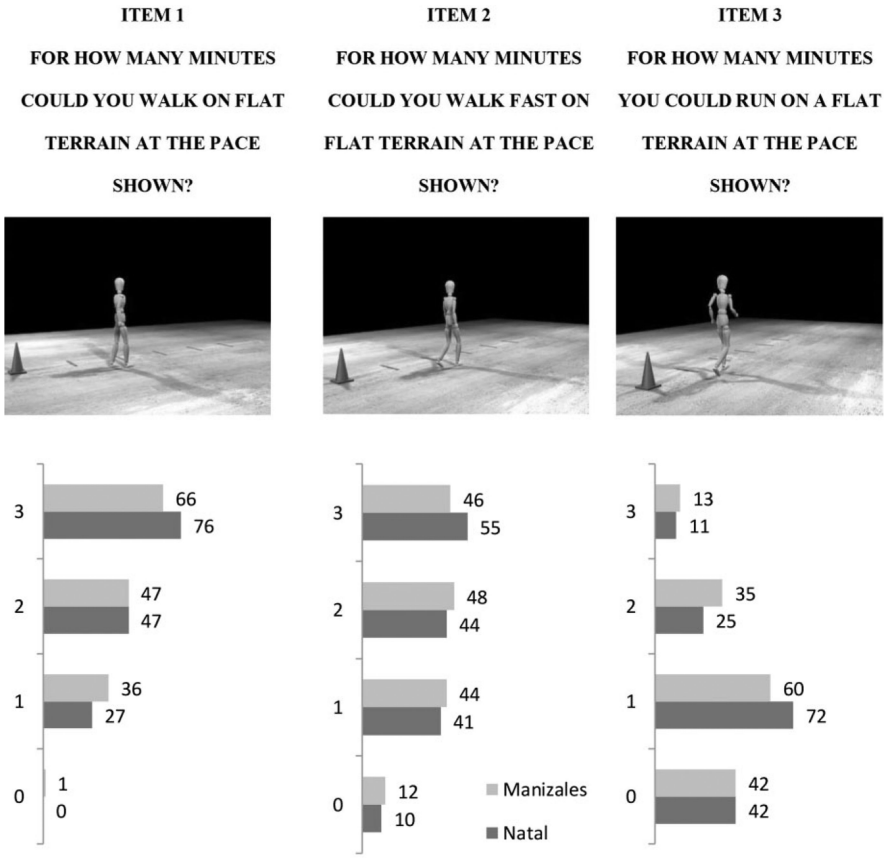

Figure 1.

Screenshot and graphic of number of participants for responses for items 1, 2 and 3 of the short form of the Mobility Assessment Tool. Responses to the four categories (0, 1, 2, 3 and 4, respectively, in the graphic) are none, 5–15, 20–30 and >30 min.

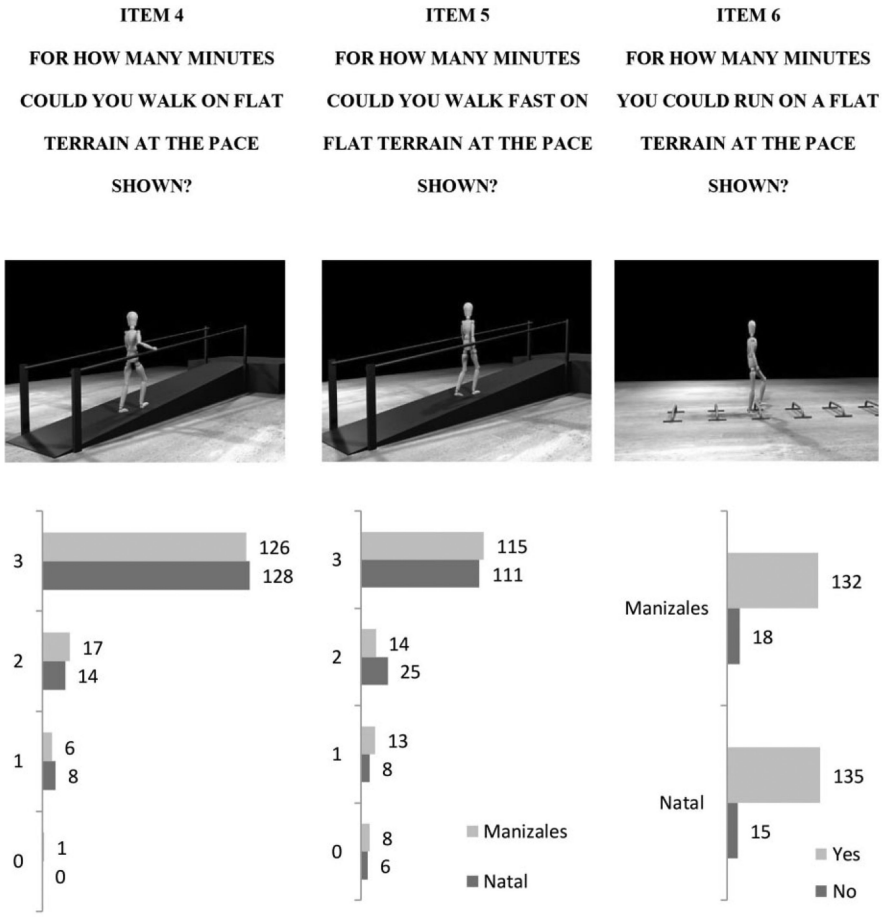

Figure 2.

Screenshot and graphic of number of participants for responses for item 4, 5 and 6 of the short form of the Mobility Assessment Tool. Responses to the four categories (0, 1, 2, 3 and 4 respectively, in the graphic for items 4 and 5) are none, 1, 2, 3 or 4, and responses for item 6 are “yes” or “no”.

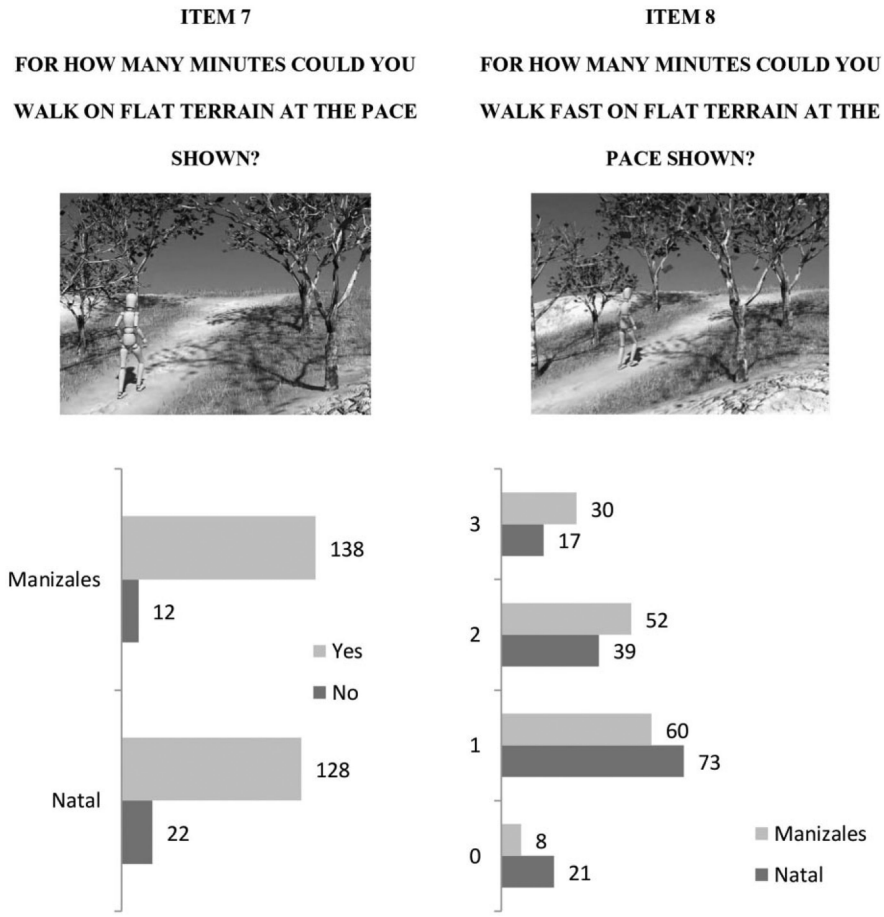

Figure 3.

Screenshot and graphic of number of participants for responses of items 7 and 8 of the short form of the Mobility Assessment Tool. Responses are “yes” or “no” for item 7, and for the item 8 responses to the four categories (0, 1, 2, 3 and 4, respectively, in the graphic) are none, 5–15, 20–30 and >30 min.

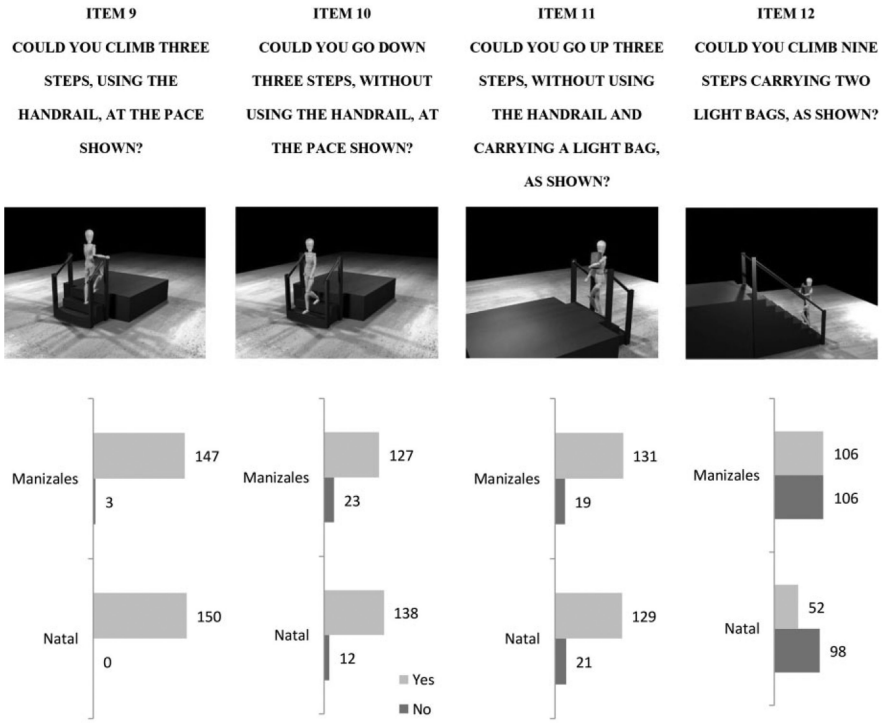

Figure 4.

Screenshot and graphic of number of participants for responses for items 9, 10, 11 and 12 of the short form of the Mobility Assessment Tool. Responses are “yes” or “no”.

Table 1

Descriptive characteristics of study participants by research site

Characteristic	Mean ± SD or %		
	Natal (*n* = 150)	Manizales (*n* = 150)	*P*-value
Age (years)	69.6 ± 3.0	69.1 ± 6.4	0.43
Illiterate	22.0%	11.3%	0.001
Years of education	6.4 ± 4.5	4.8 ± 3.5	<0.001
Married or cohabiting partner	57.3%	50.7%	0.24
Insufficient monthly income	41.3%	58.2%	0.003
Self-rated health			
Excellent/very Good	13.3%	49.3%	<0.001
Fair	34.0%	42.7%	<0.001
Poor/very Poor	52.7%	8.0%	<0.001
MAT-sf	60.7 ± 8.5	60.6 ± 8.5	0.93
Functional limitations	2.0 ± 1.9	2.4 ± 2.0	0.16
Short Physical Performance Battery	9.5 ± 1.8	9.7 ± 2.0	0.36

MAT-sf, short form of the Mobility Assessment Tool scores.

Table 2

Descriptive analysis of short form of the Mobility Assessment Tool scores in Brazil and Colombia by socioeconomic variables and self rated health

Variables	Mean ± SD of MAT-sf scores			
	Natal, Brazil		Manizales, Colombia	
Sex		$P = 0.01$		$P < 0.01$
Men	62.4 ± 8.3		63.0 ± 7.4	
Women	58.9 ± 8.3		58.2 ± 8.7	
Age (years)		$P = 0.68$		$P = 0.13$
65-69	60.9 ± 8.4		61.7 ± 7.9	
70-75	60.4 ± 8.5		59.6 ± 8.8	
Marital status		$P = 0.15$		$P < 0.05$
Married or cohabiting partner	59.5 ± 8.8		58.9 ± 9.2	
Single	61.5 ± 8.1		62.2 ± 7.3	
Illiterate		$P = 0.06$		$P = 0.92$
No	61.4 ± 8.2		60.6 ± 8.7	
Yes	58.2 ± 9.1		60.4 ± 5.5	
Income		$P = 0.39$		$P = 0.22$
Very sufficient	62.1 ± 6.6		62.3 ± 5.0	
Sufficient	60.7 ± 8.2		61.9 ± 8.0	
Insufficient	62.6 ± 7.4		59.1 ± 8.8	
Very insufficient	59.0 ± 9.9		62.3 ± 8.7	
Self-rated health		$P < 0.001$		$P < 0.001$
Excellent/very good	65.9 ± 5.8		62.9 ± 7.8	
Fair	63.7 ± 6.2		59.2 ± 7.9	
Poor/very poor	57.4 ± 9.0		53.8 ± 10.6	

MAT-sf, short form of the Mobility Assessment Tool.

Table 3

Means of short form of the Mobility Assessment Tool according to categories of functional limitations and physical performance

Variables	Natal, Brazil			Manizales, Colombia		
	n	Mean ± SD	*P*-value	*n*	Mean ± SD	*P*-value
Functional limitations			<0.001			<0.001
None	43	65.6 ± 6.1		38	66.8 ± 3.9	
1 to 3	74	61.8 ± 6.5		67	61.6 ± 7.6	
4 to 7	33	51.7 ± 8.3		45	54.0 ± 8.0	
SPPB			<0.001			<0.001
11 and 12	45	65.1 ± 5.4		60	63.6 ± 6.4	
8 to 10	84	60.7 ± 7.6		75	60.4 ± 8.5	
Less than 8	21	51.0 ± 9.6		15	49.6 ± 6.6	

SPPB, Short Physical Performance Battery.

Table 4

Linear regressions of short form of the Mobility Assessment Tool on functional limitations and physical performance

	Natal Coefficient (SE)	*P*-value	Manizales Coefficient (SE)	*P*-value
Functional limitations				
Constant	66.20 (0.78)	<0.001	66.75 (0.84)	<0.001
Functional limitations	−2.76 (0.28)	<0.001	−2.58 (0.27)	<0.001
R^2	0.39		0.38	
Physical performance				
Constant	36.23 (3.21)	<0.001	40.40 (2.99)	<0.001
SPPB score	2.58 (0.33)	<0.001	2.09 (0.30)	<0.001
R^2	0.29		0.24	

SPPB, Short Physical Performance Battery.

Table 5

Regression models of short form of the Mobility Assessment Tool on health status, research site, sex and physical performance

Baseline variables	Model I Coefficient	Standard error	*P*-value	Model II Coefficient	Standard error	*P*-value
Constant	55.85	0.91	<0.001	60.23	1.10	<0.001
SRH excellent/very good *vs* poor/very poor	8.67	1.33	<0.001	6.52	1.23	<0.001
SRH fair *vs* poor/very poor	5.49	1.17	<0.001	3.94	1.08	<0.001
Manizales *vs* Natal	−3.64	1.05	0.001	−3.37	0.94	0.001
Men *vs* women	3.68	0.89	<0.001	2.89	0.81	<0.001
SPPB 11 or 12 *vs* <8				11.65	1.39	<0.001
SPPB 8-10 *vs* <8				2.77	.89	0.002
R^2	18%			34%		

SRH, self-rated health; SPPB, Short Physical Performance Battery.