

Physical Functioning Among Patients Aging With Human Immunodeficiency Virus (HIV) Versus HIV Uninfected: Feasibility of Using the Short Physical Performance Battery in Clinical Care of People Living With HIV Aged 50 or Older

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Background. The Short Physical Performance Battery (SPPB) is a well regarded physical functioning assessment including balance, gait speed, and chair-stand tests. Its use has not been widely assessed in human immunodeficiency virus (HIV) care. We evaluated the feasibility of integrating the SPPB into care of aging people living with HIV (PLWH) and compared SPPB performance with aged HIV-uninfected individuals.

Methods. We enrolled PLWH aged ≥ 50 at 3 HIV clinics and compared their SPPB scores and subscores with older HIV-uninfected adults in the Health, Aging, and Body Composition (Health ABC) study. We conducted regression analyses on age stratified by sex and adjusting for site, and we calculated percentage variance explained by age among PLWH and HIV-uninfected adults.

Results. The SPPB was feasible to implement in clinical care and did not require licensed professionals; 176 PLWH completed it with a mean completion time of 7.0 minutes (standard deviation = 2.6). Overall mean SPPB score among PLWH was 10.3 (median 11.0, 25th percentile 9.0, 75th percentile 12.0). People living with HIV were younger than HIV-uninfected individuals (55 vs 74 years old). Mean SPPB scores and most subscores were similar among PLWH and older HIV-uninfected individuals despite the ~ 20 -year age difference. Regression analyses of gait speed revealed similar slopes in PLWH and HIV-uninfected individuals; however, separate intercepts were needed for PLWH. Mean gait speeds were faster in older HIV-uninfected men and women ($P < .01$), yet relationships with age within PLWH and HIV uninfected were similar.

Conclusions. The SPPB can be implemented into busy HIV clinics. Despite the ~ 20 -year age difference, mean scores were similar among PLWH and older HIV-uninfected individuals, although gait speed was faster among HIV-uninfected individuals.

Keywords. aging; HIV; physical functioning; short physical performance battery.

Antiretroviral therapy (ART) has led to a dramatic increase in life expectancy for people living with human immunodeficiency virus (PLWH) [1–4]. However, treated PLWH remain at increased risk for chronic conditions associated with aging such as cardiovascular disease, neurocognitive decline, and frailty as well as decreased physical functioning [5–8].

Physical function measures have multiple purposes among older adults including identification of those at higher likelihood of falls or needing to transition to nursing homes [9]. Screening high-risk older individuals with functional status assessments allows clinicians to identify and prioritize for additional interventions those with declining function and corresponding poorer health and outcomes and higher health-care costs [10, 11]. For example, an 8-primary care-based clinical trial for community dwelling individuals over the age of 65 with frailty or prefrailty demonstrated benefits of a multifaceted intervention at 18 months for multiple domains [12]. The Short Physical Performance Battery (SPPB) has been used for >20 years to measure physical performance or functional status in older adults [13]. It is a brief battery with a timed walk, repeated chair stands, and balance tests. The SPPB is a well regarded objective physical functioning assessment, particularly for lower extremity functioning, that is feasible in

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clinical care of older adults [10] and associated with short-term mortality, disability, hospitalizations, and nursing home admission [13–15]. However, it has not been widely assessed in HIV clinical care. Its use to date among PLWH has predominantly been in small research studies [16], or in specific subgroups such as injection drug users [17] or women only [18], and most often in the setting of study visits [19] rather than integrated into clinical care. Information from a diverse population of PLWH in the current treatment era in which individuals often start ART earlier than they did previously is limited, as is information on the feasibility of assessing this in clinical care settings.

The study objectives were thus 3-fold: (1) evaluate the feasibility of integrating the SPPB among aging adults into clinical care of aging PLWH by conducting a small pilot study across 3 HIV clinics; (2) describe the pattern and level of physical functioning measured by the SPPB among a population of aging PLWH in clinical care; (3) and compare the pattern of functioning to individuals aging without HIV.

METHODS

Sites

This is an observational study conducted at 3 sites (University of Washington Madison HIV Clinic, Wake Forest University HIV Clinic, and University of Alabama Birmingham 1917 HIV Clinic) to ensure demographic, clinical, and geographic diversity and test SPPB integration into HIV clinics with different patient flow patterns.

Participants

We enrolled PLWH aged ≥ 50 years who presented for routine care visits between March 10, 2015 and June 17, 2016. All 3 sites had local Human Subjects Committee approval; however, they differed on the need for informed consent. One site considered this an evaluation project of implementing the SPPB into care and therefore did not require patient-signed consent. The other 2 sites similarly defined the purpose as a feasibility study of integrating the SPPB assessment into care but considered it a research study evaluating feasibility. Therefore, patients completed informed consent at 2 of the 3 sites; the third site's Human Subjects Committee granted a waiver of consent. Recruitment was done at the time of routine care visits; however, the clinics used different approaches for completing the SPPB based on clinic flow patterns. Two clinics administered the SPPB immediately before or right after the provider visit. The 3rd site administered it either as part of routine care visits during the dietitian assessment or by asking PLWH at the time of routine visits to schedule a time to complete it at their convenience. People living with HIV were not paid for completing the SPPB because we were testing the feasibility of it as part of clinical care.

Measures

The SPPB was selected as an evidence-based, simple, quick-to-perform physical functioning assessment within the context of busy HIV clinical settings. Additional considerations were existing evidence on potential benefits of assessing physical function in aging adults, the limited needed equipment (eg, chair and stopwatch), nonexistent ongoing supply costs, and the brief training and lack of licenses needed for those conducting the SPPB [20]. The SPPB includes timed measures of standing balance in 3 positions (side-by-side, semi-tandem, and tandem), 4-meter gait speed, and time to stand up and sit down 5 times. Each measure was assigned a score from 0 to 4 with 0 indicating inability to complete the test, yielding a summary score ranging from 0 to 12, with 8 used as binary cutpoint [13]. In addition to the SPPB, 2 clinics also had participants complete grip strength using handheld Jamar dynamometers.

Health, Aging, and Body Composition

We were interested in how PLWH compared with HIV-uninfected adults and therefore included as a comparison group baseline data from older adults in the Health, Aging, and Body Composition (Health ABC) study who had completed the SPPB. Health ABC is a longitudinal cohort of healthy older individuals, aged 70–79 at baseline, recruited in 1997–1998, who were free of difficulty walking one-quarter mile or difficulty climbing 10 steps [21].

Analyses

Descriptive statistics were used to describe demographic and clinical characteristics for PLWH and data from Health ABC for HIV-uninfected groups. Mean scores and standard deviations (SDs) were calculated for overall SPPB score, each SPPB component, grip strength (kg), chair stand speed (seconds), and gait speed (meters/second) among PLWH and HIV-uninfected individuals. Differences between groups on performance measures were evaluated using either *t* tests (for normally distributed continuous variables), the Wilcoxon 2-sample test for overall SPPB score due to skewness, and exact tests for contingency tables (eg, SPPB component subscores). Cumulative score distributions are presented for PLWH and HIV-uninfected individuals. We also present distributions, along with kernel density plots, of underlying continuous gait speed and grip strength by sex among PLWH and HIV-uninfected individuals. To further explore the associations between age and gait speed and grip strength, we conducted regression analyses stratified by sex and adjusted for site. In sensitivity analyses, we repeated grip strength analyses also adjusting for body mass index (BMI). Tests for equality of intercepts and slopes were performed, and we present slopes (95% confidence interval) and percentage variance explained by age for each sex among PLWH and HIV-uninfected individuals.

RESULTS

Feasibility

A total of 176 PLWH completed the SPPB across 3 sites. The SPPB was found to be feasible to implement in clinical care. Training time was ~1 hour or less for those conducting the SPPB using a standardized protocol across sites. Sites selected which type of staff members would conduct the SPPB, and there was some variation in terms of selected staff (medical assistants, coordinators, vs a dietician); however, no sites hired additional staff. No serious disruptions to clinic flow were noted. No known injuries resulted from the assessment. Mean time to complete the assessment at the 2 sites that tracked this (N = 137) was 7.0 minutes (SD = 2.6 minutes). Refusals were tracked for one site at which 76 PLWH completed the assessment, 2 refused, and 2 were unable/unwilling to complete the assessment.

Short Physical Performance Battery Among People Living With Human Immunodeficiency Virus

The mean age of PLWH was 55, 50% were white, 45% were African American/Black, and 19% were female (Table 1). There

Table 1. Demographic and Clinical Characteristics of PLWH and Aging HIV-Uninfected Adults From the Health ABC Study

| Characteristic | PLWH ^a Mean (SD) or N (%) N = 176 | Health ABC Cohort Mean (SD) or N (%) N = 3075 |
|--|--|---|
| Age, years (mean, SD) | 54.6 (6.5) | 73.6 (2.9) |
| Race/Ethnicity | | |
| White | 88 (50%) | 1794 (58%) |
| African American/Black | 80 (45%) | 1281 (42%) |
| Other/Unknown | 8 (5%) | |
| Sex | | |
| Female | 33 (19%) | 1584 (52%) |
| Male | 143 (81%) | 1491 (48%) |
| HIV Risk Factor | | |
| Heterosexual | 41 (23%) | |
| IDU | 25 (14%) | |
| MSM | 106 (60%) | |
| IDU and MSM | 4 (2%) | |
| CD4 nadir count (cells/mm ³) | 222 (194); median = 170 | |
| <200 | 92 (53%) | |
| 200–349 | 42 (24%) | |
| 350–499 | 30 (17%) | |
| ≥500 | 11 (6%) | |
| Current CD4 count (cells/mm ³) | 643 (356); median = 601 | |
| Current Viral Load (Copies/mL) | | |
| <40 (undetectable) | 157 (90%) | |
| 40–199 | 7 (4%) | |
| ≥200 | 10 (6%) | |

Abbreviations: HIV, human immunodeficiency virus; IDU, injection drug user; MSM, men who have sex with men; PLWH, people living with HIV; SD, standard deviation.

^aN for PLWH ranged from 174 to 176 for clinical data due to incomplete data.

were some variations across sites in terms of patient populations. For example, the percentages of female participants across the 3 sites ranged from 7% to 27%, and the percentages who were Black or African American ranged from 17% to 62%, consistent with the overall clinic populations themselves. The current mean CD4 cell count was 643 cells/mm³ (SD = 356), mean CD4 cell count nadir was 222 cells/mm³ (SD = 194), and 90% had an undetectable viral load. We examined overall SPPB score, each of its components, and continuous measures of grip strength and gait speed among PLWH. Overall SPPB score among PLWH over age 50 was 10.3 (median 11.0, 25th percentile 9.0, 75th percentile 12.0) (Table 2). Average grip strength was 26.5 kg for women and 38.2 kg for men, whereas women walked an average of 0.99 meters/second and men 1.13 meters/second.

People Living With Human Immunodeficiency Virus (HIV) Versus HIV-Uninfected Individuals From Health ABC Cohort

The mean age of PLWH was younger than HIV-uninfected individuals (55 vs 74 years old) with a lower proportion of women (19% vs 52%) (Table 1). Despite the ~20-year age difference, overall mean SPPB score was slightly higher among PLWH versus HIV-uninfected individuals (10.3 vs 10.1) with a similar percentage with a SPPB score <8 (7.4% vs 6%) (Table 2). Figure 1 shows a comparison of the cumulative SPPB score for PLWH and HIV-uninfected individuals. The cumulative percentage is similar for lower SPPB scores (ie, the percentage with poor physical functioning), whereas at higher scores a smaller percentage of PLWH had scores of 10 or 11 (good function) despite being ~20 years younger.

Likewise the SPPB subscores looked similar among PLWH and HIV-uninfected older individuals despite the age difference with no statistically significant difference in balance tests (3.8 vs 3.7), statistically significant but small differences in gait test (3.8 vs 3.9), and statistically significant differences in chair stand test (2.8 vs 2.4) (Table 2). Gait speeds were ~0.1 meters/second lower in both PLWH men and women, whereas chair stand times were ~1.5 seconds faster (Table 2). Figure 2 SPPB subscore histograms among PLWH and HIV-uninfected older adults show a similar distribution of scores for balance and gait speed. In contrast, a slightly shifted distribution of scores was seen for chair stands for PLWH versus HIV-uninfected older adults (χ^2 test, $P < .01$). In addition, chair stands had the highest proportion of PLWH and uninfected individuals with reduced performance, with only 37% of PLWH and 19% among HIV-uninfected individuals having the highest possible score. We examined the distribution of gait speed and grip strength among PLWH and HIV-uninfected older adults stratified by sex (Figure 3). Although sample size was limited for female PLWH, gait speed histograms indicated a shift in the distribution toward poorer performance for PLWH for both men and women.

Regression analyses of gait speed and grip strength stratified by sex to examine associations with age revealed similar slopes in PLWH and HIV-uninfected individuals (Table 3).

Table 2. Overall SPPB Scores and Subscores, Grip Strength, and Walk Speed Among PLWH and Aging HIV-Uninfected Adults From the Health ABC Study

| Characteristic | PLWH Mean (SD) or N (%) N = 176 | Health ABC Cohort Mean (SD) or N (%) N = 3075 ^a | P Value for Equality of Groups ^d |
|--|---------------------------------------|--|---|
| SPPB | | | |
| Overall Score | 10.3 (1.83) | 10.1 (1.55) | <.001 |
| <8 | 13 (7.4%) | 182 (6.0%) | .4 |
| Balance Test | 3.8 (0.66) | 3.7 (0.82) | .5 |
| Chair Stand Test | 2.8 (1.20) | 2.4 (1.10) | <.001 |
| Gait Test | 3.8 (0.62) | 3.9 (0.31) | <.001 |
| Grip Strength^c | | | |
| Women | 26.5 (7.7) | 23.4 (6.0) | .08 |
| Men | 38.1 (10.6) | 38.4 (8.7) | .8 |
| Short Distance Gait Speed^b | | | |
| Women | 0.99 (0.20) | 1.12 (0.22) | <.001 |
| Men | 1.10 (0.27) | 1.23 (0.24) | <.001 |
| Chair Stand Time (seconds) ^b | 12.7 (4.2) | 14.3 (4.0) | <.001 |

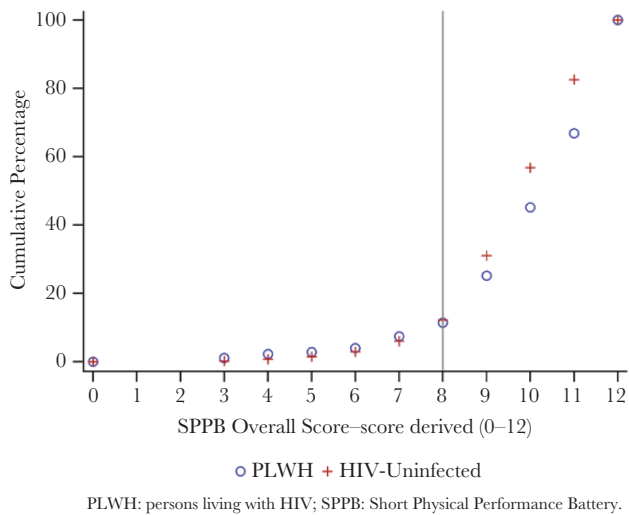
Abbreviations: HIV, human immunodeficiency virus; PLWH, persons living with HIV; SD, standard deviation; SPPB, Short Physical Performance Battery.

^aSample size for Health ABC ranged from 2952 to 3075 per test.

^bFour-meter walk for PLWH; 6 meter walk for Health ABC, N = 175 for PLWH for the walk speed due to inability of one of the participants to do the walk due to health reasons (spina bifida); N = 169 for chair stand time for PLWH.

^cWake Forest did not perform grip strength testing.

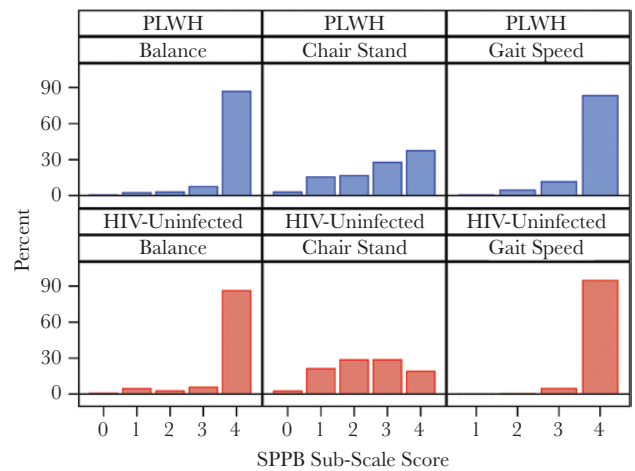
^dOverall SPPB score tested using Wilcoxon 2 sample test; grip strength and continuous gait speed tested using 2-sample t test; proportion SPPB <8 tested using Fisher’s exact test; SPPB subscores tested using exact tests for contingency tables.



PLWH: persons living with HIV; SPPB: Short Physical Performance Battery.

Figure 1. Cumulative percentage with overall SPPB scores in PLWH and aging HIV-uninfected adults from the Health ABC study.

However, analyses indicated that separate intercepts were needed for the different PLWH sites, even in the presence of the small sample sizes ($P = .004$ for men and gait speed; $P = .09$ for women and gait speed). Repeating grip strength analyses and also adjusting for BMI revealed similar associations (data not shown). Figure 4 contains plots of the slopes in Table 3, allowing for different intercepts for each study. This figure demonstrates similar findings to Figure 3 with gait speeds, on average, faster in older HIV-uninfected individuals, yet the relationships with age within PLWH and HIV-uninfected were similar.



PLWH: persons living with HIV; SPPB: Short Physical Performance Battery.

Figure 2. Distribution of SPPB sub-scale scores among PLWH and aging HIV-uninfected adults from the Health ABC study.

DISCUSSION

Antiretroviral therapy is allowing many PLWH to live to an older age. However, they are doing so with excess morbidity and mortality compared with HIV-uninfected individuals [22]. A state-of-the-science report from the Office of AIDS Research Working Group on HIV and Aging emphasized the importance of using well validated indices to predict which patients may need additional interventions and the benefits of focusing on preserving function [22]. In this pilot study, we successfully implemented the SPPB, a physical

functioning assessment, into clinical visits for PLWH age ≥ 50 at 3 sites using different approaches based on local site clinic flow. The entire assessment was brief and well tolerated. Minimal staff training was needed, and special baseline skills or licensed professionals were not required. Using the SPPB integrated into clinical care of PLWH over 50, we identified high levels of impaired functioning, with functioning similar to or less than older adults without HIV who were ~ 20 years older.

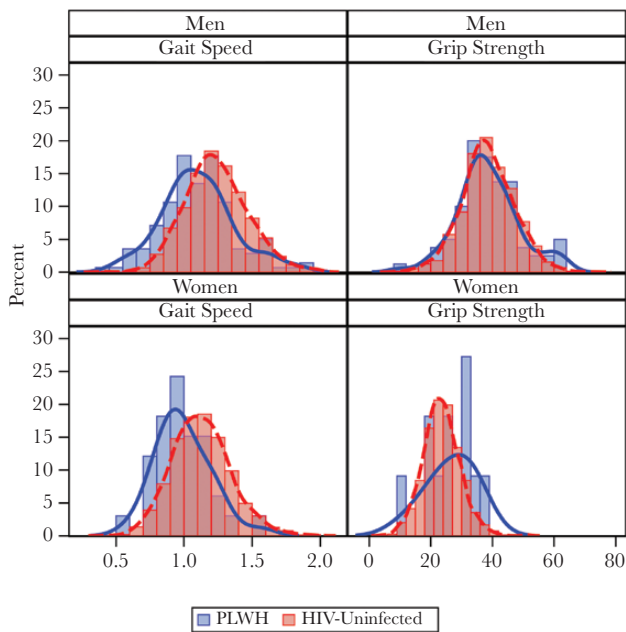
Short Physical Performance Battery in Human Immunodeficiency Virus Clinical Care

A prior small study recruited PLWH for an assessment including the SPPB from a clinical setting, although participants self-referred from study fliers to a nonclinic site; the study was not integrated into care [18]. Another larger study

similarly recruited from HIV care but involved a specific study visit to complete the assessment [19]. We used several approaches to complete the SPPB from PLWH in care during clinic visits and as separate visits. Based on clinic flow, a 6- to 8-minute assessment integrated into care for a subset of individuals, specifically PLWH ≥ 50 years of age, is often feasible during clinic visits before or after seeing the provider. Across our sites, patients completed the assessment immediately before or after clinic visits; one site even sometimes conducted assessments separately from provider visits. From a logistical standpoint, having PLWH complete the SPPB at a clinic visit rather than at a different place or time was found to be easiest, because it eliminated the need for the patient to return for an additional visit, thus decreasing patient and staff burden. On the other hand, decisions to complete before versus after the provider visit were more complicated and varied day-by-day and patient-by-patient. Specifically, because the SPPB was brief, it was often feasible to complete before the provider visit without delaying the provider. However, when the provider was already ready to see the patient, it was best to postpone to afterwards rather than not completing the assessment or having a negative impact on clinic flow. We found that the SPPB was fairly easy to administer and integrate into clinical care with some allowable variation in timing of completion.

Human Immunodeficiency Virus and Short Physical Performance Battery

Advantages of physical functioning measures such as the SPPB integrated into clinical care are that they appear to integrate multiple facets of disease processes, comorbidities, and health such as fitness, activity, and nutrition, emotional status, as well as aging [10]. However, limited data are available on the use of the SPPB in PLWH to date. A small study of 21 PLWH ≥ 54 years of age on ART and 10 controls found that those with HIV required more time to complete the chair stands than those without HIV. In addition, no significant associations were found between inflammatory markers and physical performance in this small study [16]. Another small study of women with HIV also examined inflammatory markers



† Note that N=11 for Women and Grip Strength in the PLWH Studies (See Table 1)

Figure 3. Histogram and density plot of grip strength† and gait speed by sex among PLWH and aging HIV-uninfected adults from the Health ABC cohort.

Table 3. Regression Slopes and Percentage Variation Explained by Age for Grip Strength and Walk Speed on Age Among PLWH and Aging Adults From the Health ABC Study by Sex

| Sex | "Outcome" Performance Measure | PLWH | HIV Uninfected | Percent Variation Explained by Age Effects | Test for Equality of Slopes (PValue) |
|-------|-------------------------------|------------------------------------|---|--|--------------------------------------|
| Women | Grip Strength | -0.58 (-1.28, 0.13); N = 11 | -0.31 (-0.41, -0.20); N = 1496 | 2.3% | .5 |
| | Walk Speed | -0.006 (-0.018, 0.006); N = 33 | -0.009 (-0.013, -0.006); N = 1556 | 1.6% | .6 |
| Men | Grip Strength | -0.33 (-0.70, 0.04); N = 81 | -0.62 (-0.78, -0.47); 4.3%; N = 1431 | 4.2% | .2 |
| | Walk Speed | -0.005 (-0.011, 0.001); N = 141 | -0.009 (-0.014, -0.005); N = 1462 | 1.3% | .2 |

Abbreviations: HIV, human immunodeficiency virus; PLWH, people living with HIV.

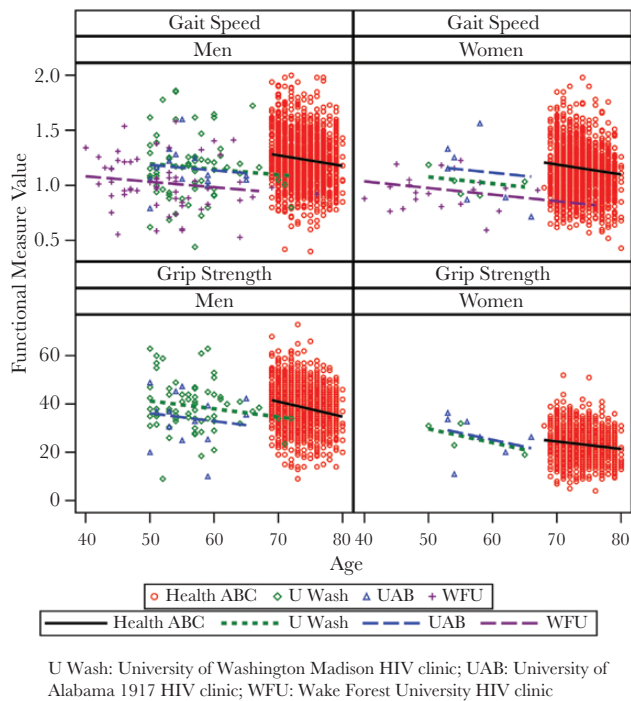


Figure 4. Simple linear regression of gait speed and grip strength on age among PLWH from 3 sites (stratified by site) and aging adults from the Health ABC study.

($N = 72$) and found that gait speed and chair stand scores were the most impacted among women with lower physical function and that women with lower physical function were more likely to have more comorbidities [18]. Another study included 359 PLWH 45–65 years old recruited from a single site, the University of Colorado Hospital Infectious Diseases Group Practice clinic, who were willing to complete a study visit for a comparison of measures including the SPPB, a 400-meter walk, and an assessment of Fried’s frailty phenotype [19]. Across all 3 assessments in the Colorado study, low-functioning individuals had more comorbidities and were taking more non-ART medications [19].

One of the largest studies that included the SPPB in PLWH to date was conducted in the ALIVE (AIDS Linked to the IntraVenous Experience) cohort of injection drug users, 30% of whom had HIV [17]. Mortality was increased among those with an SPPB score ≤ 10 among those with and without HIV, and PLWH were found to have a 30% increased odds of having a SPPB score ≤ 10 . The highest increased risk of death was seen in those with both HIV and reduced SPPB scores. Having good HIV markers (CD4 cell count and viral load) moderated to some extent the odds of reduced physical functioning as measured by the SPPB compared with HIV-uninfected individuals but did not eliminate it. However, our study demonstrated poor physical functioning despite most PLWH having a high CD4 count and undetectable viral load.

We were interested in additional comparisons to those without HIV. Normative data among those aged 50–59 is limited

because SPPB is most often used in older adults. We found that the mean SPPB score among PLWH ≥ 50 in clinical care was 10.3. This contrasted to mean SPPB scores of 10.8 among 81 similar aged (50–59 years old) HIV-uninfected women with abdominal obesity enrolled in weight loss studies [23, 24]. When we compared our findings with results from the Health ABC study, we found that overall SPPB scores were similar among PLWH and HIV-uninfected adults who were ~ 20 years older. However, patterns differed for the chair stand subscore, with slightly better scores among PLWH and better gait speed among the HIV-uninfected individuals when gait speed is measured on a continuous scale. In addition, we found a similar percentage of PLWH with substantially impaired physical function as defined by a SPPB score < 8 compared with aging HIV-uninfected individuals despite the 20-year difference.

Limitations

This study was only of modest size and was a cross-sectional assessment of physical functioning among aging PLWH integrated into clinical care settings; therefore, it cannot be used to determine trends over time. Prior studies have suggested that a change in SPPB of 0.5 points is a small but clinically meaningful change based on older adults and stroke survivors, whereas a 1-point change is considered substantial [25]. However, the cross-sectional nature of this study provides no input on meaningful changes over time in PLWH. This study also does not generalize to PLWH not yet diagnosed with HIV or engaged in care. This study was limited to PLWH well enough to come to clinic and to those ≥ 50 . Whether a different age cutoff might be better was not assessed. This study included fewer women than men with HIV. Although this is consistent with the HIV epidemic in the United States overall, it limits the conclusions that can be drawn for women with HIV. Finally, these comparisons were based on the assumption that participants in the Health ABC study were HIV uninfected. Given the era when Health ABC enrolled participants, and the age and health of the participants, this is likely true but not proven. Another potential limitation is that the Health ABC study may have differed in ways beyond just HIV status such as being a healthier cohort or a cohort with different comorbidities and behavioral characteristics.

Strengths

Study strengths include the demographic, geographic, and clinical diversity of PLWH from 3 sites. We allowed clinics to use multiple approaches to implement the SPPB into clinical care, thereby providing better information on whether it was feasible, and allowing sites to try different approaches to ensure that the best approaches were identified for each site. We included the SPPB, which is an objective physical functioning measure that is well regarded [10]. Although the SPPB emphasizes lower extremity physical functioning, we also included hand grip strength. Finally, we parsed individual SPPB subscores for

comparisons with HIV-uninfected individuals because patterns may differ.

Future Research

In older adults, this type of approach to including physical functioning measures into clinical care has been advocated as part of routine care and screening [10], understanding that this is a general indicator that reflects a number of underlying physiological processes and also predicts a number of important future events [10]. However, it has been noted that for this assessment to be useful, interventions to change outcomes are required [10]. As an example, in older adults, a multidisciplinary structured approach to gait disorders has been proposed [26]. Benefits and costs of this approach in clinical care of PLWH still needs additional evaluation. However, benefits might include better risk prediction and identifying high-risk individuals most likely to benefit from additional clinical resources such as fall prevention interventions, exercise prescriptions, and increased dietary protein intake. Costs include additional staff and patient burden and potential impact on clinic flow. Additional unanswered questions include how and when providers will use this information, which interventions should be triggered, what results will be considered most meaningful, whether all components are needed or whether specific SPPB components such as just the chair stand scores provide the needed information, whether results are of use to PLWH and if so what results are meaningful, and how often the SPPB should be completed. Finally, this study included PLWH ≥ 50 , which may or may not be the best cutoff, raising additional questions regarding who exactly would benefit the most from screening.

CONCLUSIONS

This study demonstrated the feasibility of integrating physical performance assessment into clinical care of older PLWH across a range of functioning. Overall, functional status among PLWH appears to be similar to that of healthy uninfected adults who are ~20 years older. Integrating SPPB into care will enable us to elucidate factors associated with aging among PLWH, which in turn may identify intervention targets to improve functioning.

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