ORIGINAL RESEARCH

Aging-Related Concerns of People Living with HIV Referred for Geriatric Consultation

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Purpose: People with HIV (PWH) are living longer lives and likely experiencing accentuated aging. Comprehensive geriatric assessment (CGA) has been proposed as a way to identify and help meet each individual patient's needs.

Patients and Methods: We performed a retrospective review of the results of CGA in an HIV clinic in New York City. CGA included assessment of basic and instrumental activities of daily living, screens for depression, anxiety, frailty, cognition, and quality of life, along with general discussion of concerns and goals. We compared the group of PWH referred for CGA to those of comparable age who were not referred to determine the factors that were associated with referral. We carried out a descriptive analysis of those undergoing CGA, along with regression to determine factors associated with poorer PHQ-2 depression scores and higher VACS score.

Results: A total of 105 patients underwent full CGA during the study period. Mean age of referred patients was 66.5 years, ranging from 50 to 84 years (SD 7.99). More than 92% were virally suppressed. Compared with their non-referred counterparts over 50, referred patients were older and had more functional comorbidities like cerebrovascular disease, neuropathy, and urinary incontinence. More than half complained of fatigue, and 2/3 noted poor memory. Almost 60% were frail or prefrail. Ninety patients were asked about their goals, and the most commonly cited were related to health or finances; fifteen patients were unable to articulate any goals. Having fewer goals and noting weight loss or fatigue were predictive of higher scores on the PHQ-2 depression screen.

Conclusion: Although most older PWH undergoing CGA can manage their ADL, many have concerns and deficits beyond their comorbidities. CGA offers an important window into the psychosocial concerns and needs of older PWH.

Keywords: comprehensive geriatric assessment, comorbidity, frailty, IADL

Introduction

With the advent and more effective dissemination of effective antiretroviral therapy, the population of people living with HIV (PLH) is increasing worldwide. In the United States, the Centers for Disease Control and Prevention (CDC) reported that in 2018, 51% of PLH were at least 50 years of age or older.[1] In New York City, the population with HIV is even older, with 31.6% in the 50–59 age range, and 23.3% 60 years and older as of 2018.[2]

That people are living and aging with HIV is now well recognized. Age has not mitigated stigma;[3] loneliness[4] and depression[5] remain highly prevalent. People aging with HIV have higher rates of cognitive decline,[6] comorbidities,[7,8] multimorbidity,[9] geriatric (aging-related) syndromes,[10] and polypharmacy[11] than

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their counterparts without HIV. There appear to be gender differences in the impact of HIV; studies have documented that women with HIV have poorer physical function,[12] comorbidity burden,[13] and cognition[14] than HIV+ men.

It has been argued that a geriatric approach is needed for people who are aging with HIV;[15,16] geriatric assessment can screen for problems that are not routinely identified on regular visits.[17] Programs to meet needs of older people with HIV are being developed around the world.[18] Examples like the Silver Clinic in England[19] and Golden Compass in San Francisco[20] have described significant comorbidities, functional burdens, and geriatric syndromes. Functional deficits are not irreversible, and timely interventions may be able to improve quality of life.[21]

In addition to quantitative studies that have identified patterns of multimorbidity,[22,23] qualitative work is starting to elucidate how people with HIV are facing aging. Despite a host of psychosocial challenges like depression, social isolation, loneliness, and stigma,[24,25] people aging with HIV describe positive factors in their life, like the importance of spirituality[26] and the value of their life experience and interest in mentoring.[27,28] Geriatric assessment provides an opportunity to better understand individual patients' needs and aspirations and can help in anticipating how clinics can prepare their workforce. This paper describes our experiences in an HIV and Aging program at the Weill Cornell Campus of the New York Presbyterian Hospital, focusing on both the quantitative and qualitative aspects of the geriatric evaluations themselves.

Methods

Although geriatricians had been providing ad hoc consultation for several years, the formal HIV and Aging program was established in 2015 at the Center for Special Studies (CSS), the HIV primary care clinic of the Weill Cornell campus of the New York Presbyterian Hospital. This program held focus groups for patient and staff and provided educational programs for staff, socialization activities for patients, and geriatric consultation embedded within CSS.

This study took place prior to the Covid-19 pandemic, when two geriatricians provided consultation services approximately weekly at CSS. One provider saw outpatients monthly, the other alternated weekly between the two clinical settings (one based in the hospital, the other in the Chelsea section of New York City).

There was no formal screening method to generate geriatric referrals. CSS attendings, who serve as the patients' primary care physicians, referred of their own initiative or, (if they did not disagree with the referral) at the request of patient or another staff member (eg, social worker). This study describes patients who kept their appointment for geriatric consultation, not the larger population of all who were referred.

During the CGA, the geriatrician took a basic history, talked with the patient about aging-related concerns, and used a compendium of simple instruments that was programmed into the electronic medical record (EHR) (EPIC Hyperspace 2019®) as a geriatric scale and that appears as a formal part of the geriatrician's note. Components of the assessment included, but were not limited to the Patient Health Questionnaire-4 (PHQ-4)[29] (a brief screen for depression and anxiety), a few questions about health, pain, hearing, vision and falls; the Gérontopôle frailty screen,[30] assessment of basic activities of daily living (ADL) and instrumental activities of daily living (IADL), grip strength, FRAX,[31] Veterans Aging Cohort Study calculator version 2 (VACS),[32] Montreal Cognitive Assessment (MoCA),[33] and simple physical exam. After gaining some experience with these assessments and recognizing that these evaluations often touched on patient goals, the geriatricians began to routinely ask patients about their goals. The final part of the assessment included a brief presentation of the case to the interdisciplinary CSS team (which included internists, psychiatrists, a gynecologist, social workers, nurses, and a dietician), and recommendations were modified, based on team input. To ensure confidentiality, data from the assessment were collected on spreadsheets on a password-protected server in compliance with Declaration of Helsinki, and analyses were approved by the Weill Cornell IRB (IRB 1505016187). The IRB waived requirements for informed consent, in light of the retrospective nature of the study. Most analyses were exploratory, using SPSS (IBM SPSS Statistics for Windows, Version 25. Armonk, NY) using the whole sample. Regressions were performed using only those for whom there were complete data; we also excluded one person who was male to female transsexual and one who was of Asian ethnicity. When appropriate, degrees of freedom are reported in parentheses. The data presented are derived from patients who had been evaluated between 2015 and early 2019 using the formal assessment tools. They do not include any information derived from follow-up visits.

This study also took advantage of a separate dataset that had been created from the entire CSS cohort to determine prevalence of comorbidities. Briefly, information from all patients who had been seen by a physician at least once at CSS between June 1, 2016 and May 31, 2017 was downloaded from the EHR into an Excel® spreadsheet. Comorbidities were derived from the problem list, past medical history, or past surgical history using specific ICD-10 codes; in the case of renal disease, anemia, and diabetes, lab data were also queried. In addition to evaluating comorbidities as a whole, we also evaluated them in terms of their impact. Two of the authors (ELS, MJG) a priori reviewed the comorbidities and subclassified them as having a high impact on mortality ("high risk"), and/or on functional impairment ("functional"). Mean number of total, high risk, and functional comorbidities were calculated for each subject. Multimorbidity was defined as 2 or more comorbidities. The diagnostic criteria and classification scheme can be found in Supplementary Table 1A and B.

We used a hierarchical multiple regression to explore how some variables included in our geriatric assessment related to the outcomes of screens such as PHQ-2 and VACS. A hierarchical multiple regression has the advantage of allowing the entering of the geriatric assessment variables as a set, after controlling for demographics, to attain two pieces of information: 1) if as a set they explain a significant amount of variance beyond that explained by demographics, and 2) how much unique variance they explain as a set. This method still yields all the information that a single step multiple regression does, such as which variables are uniquely predictive of the outcome measures.

Results

Overall, geriatricians performed 105 outpatient assessments that included use of formal scales. Table 1 provides basic demographics and compares them to the overall CSS population over the same age range. Mean age was 66.5 years, ranging from 50 to 84 years (SD 7.99). Approximately 75% were cis-male, and 39% were

Table 1 Characteristics of Patients Referred or Not Referred for Geriatric Consultation

Variable	Referred Sample (n = 105)	Non-Referred Sample (n =1159)
Mean age, years (SD)	66.5 (8.0)	58.0 (6.1)
Gender %	73 M, 26 F, 1 TGF	71.4 M, 27F, 0.1 TGM, 1.12 TGF
Race/Ethnicity (%)		
African-American/Afro-Caribbean	40.0	32.4
White	30.5	19.6
Hispanic	26.7	29.5
Asian	1	1.1
Other	1.9	17.6
HIV variables		
Mean years with diagnosis (SD)	21.9 (6.94)	21.5 (7.4)
Most recent CD4 count (SD)	606.2 (318.05)	602.9 (315.6)
CD4/CD8 ratio (SD)	0.9 (0.58)	0.8 (0.5)
Percent with VL <200 (n)	92.9 (92)	92.1 (14.0)
Risk factor (%)		
MSM	56.2	49.9
IDU	15.2	16
UPSWOS	36.2	37.1
Hemophilia	0	0.3
Mean number of comorbidities (SD)		
All comorbidities	5.8 (2.1)	3.6 (2.1)
High risk comorbidities	3 (1.4)	2 (1.4)
Functional comorbidities	3.1 (1.4)	1.6 (1.2)

Abbreviations: SD, standard deviation; M, male; F, female; TFG, transgender female; TFM, transgender male; VL, HIV-1 viral load; MSM, men who have sex with men; IDU, injection drug use; UPSWOS, unprotected sex with the opposite sex.

African American or Afro-Caribbean. One patient was described as biracial and was coded as African American. Of note, women were predominantly African American (20/27), while African Americans comprised a minority of men (24/76) (p<0.001). MSM was the most common risk factor for HIV, accounting for 55.56% of the patients. Viral suppression rates were excellent, with 74.8% having a viral load of <20 copies/mL, and 18% between 20 and <200 copies/mL for a total suppression rate of nearly 93%.

Supplementary Table 2A includes predictors for referral to geriatricians for assessment. Variables tested were demographic variables, smoking status, and comorbidities. The strongest predictor (by Wald X^2) was age $X^2(1)$ =37.18, p <0.001, OR=1.14 per year. No other demographic variable predicted referral after controlling for comorbidities and age. Comorbidities that were associated with an increased likelihood of referral were cerebrovascular disease $X^2(1)$ 4=4.50, p=0.03, OR=1.14; urinary incontinence $X^2(1)$=7.79, p=0.01, OR=4.83; gait disorder $X^2(1)$=8.47, p=0.003, OR=3.65; peripheral neuropathy $X^2(1)$=6.15, p=0.01, OR=2.16; and anxiety disorder $X^2(1)$ =7.27, p=0.01, OR=2.34.

In the results of formal CGA (Table 2), 80.6% were independent in ADL and 48.5% in IADL. The commonest IADL impairments were in housework and laundry, where more than 40% of patients needed at least some help. Among the ADL, nearly 15% of patients needed some help with bathing and climbing stairs. Nearly half had at least some difficulty with vision and one third with hearing, and half reported at least moderate pain. All but one had multimorbidity (at least 2 comorbidities). Mean MoCA score was 21.80 (SD 5.09). MoCA was not correlated with memory complaints ascertained during the Gérontopôle frailty screen $r (98)$ =0.06, p=0.55. Of note, despite recommendations to screen people with HIV for bone disease[34] fewer than a third had undergone bone density measurement within 2 years of geriatric assessment, and this often prompted discussion about bone health.

CGA offered opportunities to uncover a broad range of problems and concerns beyond basic assessment screens. Figure 1 depicts the frequency with which topics came up for discussion during the assessment. Cognition was the most frequent concern, and community supports, comorbidities, and function were also frequently discussed. A number of items, such as retirement or hospice, were covered infrequently.

Table 2 Findings of Geriatric Assessment

Finding	N (%)
Describing health as fair or poor	42 (41.2)
At least some difficulty with hearing	34 (33.3)
At least some difficulty with vision	48 (47.1)
Reported moderate to severe pain	52 (50.9)
Frailty (Gérontopôle)	
Complaints of fatigue	57 (55.3)
Complaints of poor memory	68 (66.0)
Living alone	65 (63.1)
Not frail	41 (39.8)
Prefrail	41 (39.8)
Frail	21 (20.4)
Needing assistance with Activity of Daily Living	
Any assistance	20 (19.4)
Grooming	4 (3.88)
Bathing	15 (13.6)
Dressing	12 (10.7)
Mouth care	1 (1)
Eating	2 (2)
Toileting	6 (5.8)
Transferring	3 (2.9)
Ambulation	7 (6.8)
Stairs	14 (13.6)
Needing assistance with Instrumental Activity of Daily Living	
Any assistance	53 (51.5)
Shopping	32 (31.1)
Housework	43 (41.7)
Laundry	42 (41.2)
Medications	20 (18.6)
Cooking	30 (29.1)
Using phone	5 (4.8)
Transportation	25 (24.3)
Finances	21 (20.4)
Other	
Active tobacco use	19 (18.3)
Bone density measurement within 2 yrs	30 (28.9)
Multimorbidity (2 or more comorbidities)	98 (99)
Mental health	Mean (SD)
PHQ4 - anxiety subscore	2.06 (2.38)
PHQ4 - depression subscore	1.75 (2.11)
MoCA score	21.80 (5.09)

These wide-ranging conversations often led to a discussion of goals, and this question was later formally added to the CGA; ninety patients were asked to articulate their goals. Most offered one or two; thirteen patients
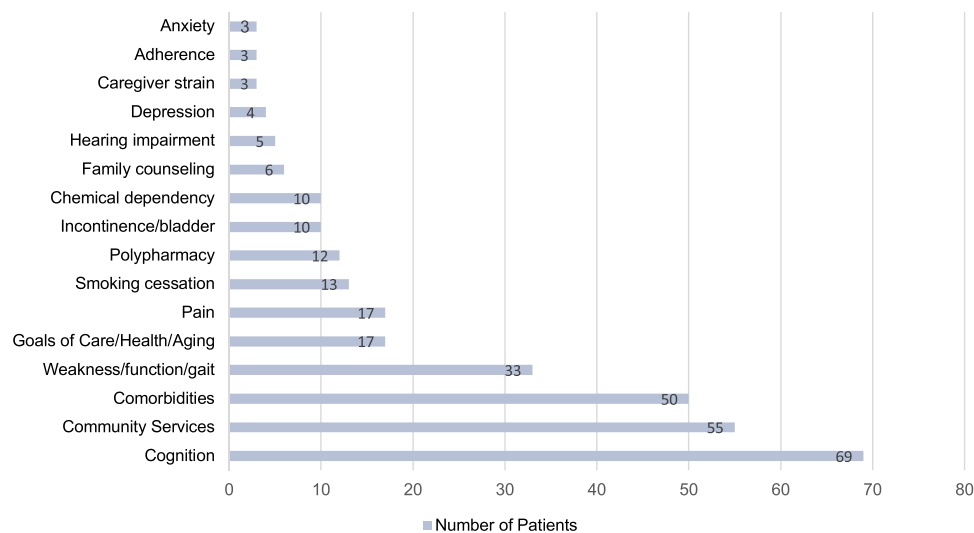
Figure 1 Topics discussed during initial comprehensive geriatric assessment.
Note: Other topics (1–2 patients): Fatigue, food insecurity, isolation, insomnia, loneliness, retirement, tricyclic choice, transplant preop, weight loss, driving, palliative care/ hospice.
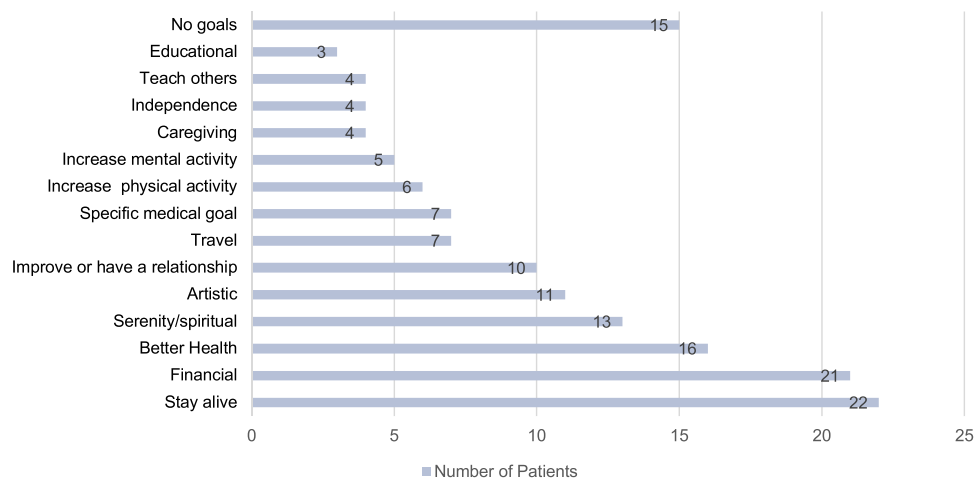

Figure 2 Goals cited by patients during initial comprehensive geriatric assessment.
Notes: Patients were allowed to cite as many goals as they wanted. Other responses: Comfort (2), Prepare for retirement (1), Start an organization (2).

offered three goals and two patients articulated four. Figure 2 depicts the number and types of goals articulated by patients during their assessment. The most commonly articulated goals were fundamental – staying alive, maintaining health, or financial stability, but many had spiritual and emotional goals as well. Fifteen patients were unable to articulate any goals.

The PHQ-2 (the depression questions in the PHQ-4) was examined in more detail, to determine how it correlated with other factors. Supplementary Table 2B describes a hierarchical multiple regression to predict higher PHQ-2 scores. In the first step, we evaluated demographic variables, HIV risk factors, function, and number of comorbidities but this set of variables was not statistically significant $F_{(11, 81)} =1.06$, $p=0.40$, $\Delta R^2=13$. In the second step, we added number of goals as well as components of the frailty index, to test if this set of variables would predict higher PHQ-2 controlling for the demographics. This step was statistically significant $F_{(9, 72)}=3.56$, $p <0.001$, $\Delta R^2=0.26$. More goals were associated with a lower depression score $t_{(73)}=-2.00$, $p<0.05$. Complaining of weight loss $t_{(72)}=2.10$, $p=0.04$ or fatigue $t_{(72)}=2.45$, $p=0.02$ were also associated with higher PHQ-2 scores. Overall the model was statistically significant $F_{(20, 72)}=2.35$, $p=0.004$, $R^2=0.40$.

We also examined variables in the CGA that might correlate with higher VACS index. Supplementary Table 2C describes a hierarchical multiple regression to predict higher VACS scores. In the first step, we included demographic variables and risk factors that are not explicitly modeled by the index. These did not predict VACS $F (6, 93)=1.72$, p=0.12, $\Delta R^2=10$. In the second step, adding the codes for number of goals as well as patient concerns was statistically significant $F (8, 85)=8.47$, p <0.001, $\Delta R^2=0.40$. Living alone, $t (85)=2.26$, p=0.03, having lost weight $t (85)=3.20$, p=0.002, and having trouble with gait $t (85)=3.97$, p <0.001 all were associated with statistically significantly higher VACS scores.

Discussion

Comprehensive geriatric assessment by its nature is wide-ranging;[16] because it takes place within the context of a clinical visit, however, CGA is limited to basic screening tools, along with time-constrained conversation and observation. This study documented that 1) CGA can uncover not only functional deficits in PWH over 50, but many other health and social concerns; 2) patients referred for CGA had a higher burden of functional comorbidities than their non-referred counterparts even in the setting of similar HIV-related variables; 3) assessing goals can provide insights into patients' aspirations and mood.

CGA has demonstrated significant functional deficits and frailty in older people with HIV[35] and offers opportunities to identify and treat many other aging-related conditions in older PWH.[36] This study reports findings from a selected group – they were referred by their providers and they agreed to the consultation; the mean MoCA was 21/30 and only 48.5% were completely independent in IADL, indicating a significant need. A study of 359 adults in San Francisco (mean age 57) who underwent geriatric assessment also revealed high functional burden, including 40% with at least one IADL impairment and 40% with possible mild cognitive impairment.[37] Older PWH have many unmet needs,[38] and CGA can provide opportunities for patients to identify concerns that are important to them but may not relate directly to HIV care. In our sample, cognition was the most commonly discussed problem, but gait, community supports, and aging itself were often discussed, reflecting the multiple psychosocial dimensions of growing old with HIV.[24] Thus, while not every older PWH may welcome CGA, this study demonstrates that many want to learn about aging issues and have not had

the opportunity to articulate their apprehensions about growing older.

Compared to their non-referred counterparts, patients in this study were older and had more multimorbidity, but had similar levels of viral suppression, CD4 cell counts, and numbers of years with HIV diagnosis. We do not have data about the functional status of those who were not referred, but it is likely that a more systematic referral process would identify many others with significant needs. Future research is needed to determine the most effective and efficient screens, which could include a variety of options such as age, patient-self assessment tools, or prognostic scores such as the VACS.[39]

We used the Gérontopôle frailty screen because of its ease of administration and its question-based (as opposed to performance-based) format; its combination of psychosocial (eg, subjective memory complaints and living alone) and physical questions not only can raise suspicions about frailty but can also provide insights into patients' deficits. In this study, for example, we found that complaints about memory were very common but not necessarily indicative of cognitive impairment; memory complaints correlated with higher scores on the PHQ-2 depression subscale but not with objective cognitive screening on the MoCA. This phenomenon has been previously reported in the population with HIV.[40] Fatigue and weight loss also correlated with higher PHQ-2 scores.

Goal setting is not a standard part of CGA, but this patient population wanted to discuss goals, and when formally introduced into the geriatric assessment, this topic provided insights into their most fundamental concerns. Many said they had no goals, but for those who did, health and financial security were most commonly cited. We found that the number of goals was inversely proportional to the PHQ-2 depression score, possibly indicating that inability to plan for the future is a significant manifestation of depressed mood. Geriatric assessment is an iterative process, where observation and questions (both direct and indirect) help the clinician develop the clearest and most detailed picture of a patient's health. Our findings show that even conversations about goals provide insights into the patient's sense of hopefulness and mental well-being.

In addition to offering more insights into an individual's function and concerns, an important purpose of geriatric assessment is making recommendations to providers and patients. In our program, the commonest recommendations to providers involved medications and screening/diagnostic tests; the commonest recommendations to patients were

referrals, psychosocial recommendations (eg, joining a program or senior center), and behavioral (eg, smoking cessation) as we have previously reported.[41]

This study has a number of limitations. It comes from a single site, and although the population is diverse, the predominance of African Americans among women makes it difficult to draw any gender-based conclusions. Because people undergoing CGA were referred based on perceived need, not through screening or on the basis of age alone, the deficits and concerns identified in this group cannot be generalizable to all older people with HIV. Nonetheless, it has demonstrated that CGA can identify problems across a wide variety of domains and offers older PWH the opportunity to voice their concerns about aging.

Conclusion

Older PWH, despite having achieved viral suppression, nonetheless have a broad range of health issues that may not be uncovered unless clinicians offer comprehensive assessment. Geriatric assessment can be accomplished with simple tools and can offer opportunities both for screening and for counseling. Future studies should examine interventions aimed at ameliorating conditions and concerns that CGA uncovers in this population.

Acknowledgments

We would like to thank the staff and patients of the Center for Special Studies. Data can be accessed by emailing a request to Dr Siegler.

Disclosure

Dr Glesby reports research support to Weill Cornell Medicine from Gilead Sciences and Regeneron; royalties from Springer and UpToDate. He is a consultant to ReAlta Life Sciences and Sobi. Dr Siegler has received research support to Weill Cornell Medicine from Gilead Sciences. She also reports philanthropic support for the HIV and Aging program from the Wayen Foundation. The authors report no other conflicts of interest in this work.

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