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Evaluation of a Clinic Dedicated to People Aging with HIV at Chelsea and Westminster Hospital: Results of a 10-Year Experience

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Abstract

Successful management of HIV infection as a chronic condition has resulted in a demographic shift where the proportion of people living with HIV (PLWH) older than 50 years is steadily increasing. A dedicated clinic to PLWH older than 50 years was established at Chelsea and Westminster Hospital in January 2009 and then extended to HIV services across the directorate. We report the results of a service evaluation reviewing 10 years of activities of this clinic between January 2009 and 2019. We aimed to estimate the prevalence of major non-infectious comorbidities, polypharmacy (≥5 medications), and multimorbidity (≥2 non-HIV-related comorbidities) and describe algorithms devised for use in HIV outpatient clinics across the directorate. A cohort of 744 PLWH older than 50 years attending this service were analyzed (93% male; mean age of 56 ± 5.5 years; 84% white ethnicity); 97.7% were on antiretroviral treatment and 95.9% had undetectable HIV-RNA at the time of evaluation. The most common comorbidities diagnosed were dyslipidemia (50.1%), hypertension (21.5%), mental health disorders (depression and/or anxiety disorders, 15.7%), osteoporosis (12.2%), obesity (11.9%), chronic kidney disease (7.5%), and diabetes (5.8%). Low vitamin D levels were found in 62% of patients [43% with vitamin D deficiency (<40 mmol/liter) and 57% with vitamin D insufficiency (40–70 mmol/liter)]. The overall prevalence of polypharmacy and multimorbidity was 46.6% and 69.3%, respectively. This study showed significant rates of non-HIV-related comorbidities and polypharmacy in PLWH older than 50 years, leading on to the implementation of clinical care pathways and new joint HIV/specialty clinics (cardiology, nephrology, neurology, metabolic, menopause, and geriatric) to improve prevention, diagnosis, and management of major comorbidities in people aging with HIV.

Keywords: HIV, aging, polypharmacy, frailty, comorbidities, pathways of care

Background

Life expectancy for people living with HIV (PLWH) has improved substantially after the introduction of combined antiretroviral treatment.[1] Despite this, increased longevity is inevitably associated with a rising prevalence of age-related comorbidities in PLWH, including cardiovascular disease (CVD), diabetes mellitus, osteoporosis, and neurocognitive impairment.[2,3]

In the United Kingdom, the proportion of people newly diagnosed with HIV older than 50 years increased from 13% in 2009 to 21% in 2018.[4,5] As a consequence of this demographic shift,[6] the burden of age-related comorbidities in PLWH is expected to increase overtime, raising the susceptibility to polypharmacy and potential drug/drug interactions (DDIs).[7] Furthermore, alterations in drug metabolism with advancing age may lead to increased drug exposure and escalate the risk of adverse side effects.[7,8] This underscores the need for a careful review of comedications to identify potential DDIs, particularly between combined antiretroviral treatment (cART) and other prescribed drugs, and prevent the risk of drug toxicity in aging PLWH.[8,9]

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To respond to the changing needs of a population aging with HIV, a specialist HIV service was established for patients older than 50 years at the Chelsea and Westminster Hospital NHS Foundation Trust (CWH) in January 2009.[10] This service was initially based at CWH and eventually extended to all sites across the HIV directorate (CWH, 56 Dean Street, 10 Hammersmith Broadway, West Middlesex Hospital, Harlow and Hertfordshire) covering different geographical areas in London and >12,000 patients. We report the results of 10-year experience of this service and the prevalence of major noninfectious comorbidities, polypharmacy (≥5 medications), and multimorbidity (≥2 non-HIV-related comorbidities) in a cohort of PLWH attending this service. We also describe clinical care pathways established in our center for the assessment and management of major comorbidities in PLWH in line with current BHIVA/EACS guidelines.[11,12]

Materials and Methods

Study design

Retrospective cross-sectional analysis of a cohort of patients attending the HIV over 50 service between January 2009 and January 2019. This study was approved by CWH as a service evaluation to review clinical practice and inform local decision-making. No identifiable clinical data were shared with individuals outside the care team.

The HIV over 50 service

PLWH older than 50 years undergo a two-step multidimensional evaluation and are screened for main age-related comorbidities (i.e., CVD, bone disorders, mental health and neurocognitive impairment, diabetes, hormonal changes, and malignancies). The rationale behind the clinical protocols and routine assessments performed in the over 50 clinic has been previously described.[10]

Data collection and descriptive analysis

Descriptive statistics [frequency, mean ± standard deviation (SD), or median with interquartile range] were used to summarize the data. The prevalence of major noninfectious comorbidities was estimated based on clinical and laboratory data collected during the 10-year study period. Hypertension was defined by a blood pressure >140/90 mmHg or history of antihypertensive drug use. Dyslipidemia was diagnosed based on fasting lipid profiles and history of statin use. Diabetes was defined by hemoglobin A1c (HbA1c) ≥48 mmol/mol (6.5%), a fasting plasma glucose ≥7 mmol/liter (126 mg/dL), or random plasma glucose ≥11 mmol/liter (200 mg/dL), or by the use of antidiabetic drugs. Impaired fasting glucose was defined by HbA1c 39–47 mmol/mol (5.7%–6.4%) or fasting plasma glucose 5.7–6.9 mmol/liter (100–125 mg/dL). Smoking status was categorized as current, past, or never, while alcohol consumption was dichotomized as < or >14 units/week on average. Body mass index (BMI) was calculated according to the following formula: body weight (kg)/height^2 (cm). Chronic kidney disease (CKD) was defined by an estimated glomerular filtration rate (eGFR) <60 mL/min/1.73 m^2. The number of comorbidities was calculated and multimorbidity defined as ≥2 non-HIV-related comorbidities and polypharmacy was defined as taking ≥5 medications. Osteoporosis was defined as T-score less than −2.5 SDs, while osteopenia was defined as T-score between −1.0 and −2.5 SDs.

Results

General

A total of 744 patients attended the over 50 service at the CWH during the study period, predominantly males (93%), with a mean (±SD) age of 56 ± 5.5 years. Eighty-four percent were white, 7.5% black African, and 8.5% from other ethnicities. The mean (±SD) duration of HIV infection was 15.2 ± 8 years and mean CD4 count was 660.8 ± 258 cell/mm^3. The majority of patients were on cART (97.7%), with undetectable HIV-RNA (95.9%) at their first clinic visit. A complete description of the sociodemographic and clinical characteristics of the study population is shown in Table 1. The most common noninfectious comorbidities diagnosed were dyslipidemia (50.1%), hypertension (21.5%), mental health disorders (depression and/or anxiety disorders, 15.8%), osteoporosis (12.2%), obesity (13.2%), CKD (7.5%) and diabetes (5.7%) (Fig. 1).

Table 1. Demographic and Clinical Characteristics

Total number of participants	744
Age, mean (SD)	56.5 (5.5)
Sex, *n* (%)	
Male	691 (92.9)
Female	53 (7.1)
Race, *n* (%)	
White	622 (84.2)
Black	56 (7.5)
Asian	7 (0.9)
Other	56 (7.5)
Years living with HIV, mean (SD)	15.2 (8)
HIV RNA, *n* (%)	
<50 copies/mL	714 (95.9)
>50 copies/mL	30 (4.1)
CD4 cell count at presentation, mean (SD)	660 (258)
CD4/CD8 ratio, mean (SD)	0.98 (3.7)
On cART, *n* (%)	724 (98)
BMI, mean (SD)	25.9 (4.3)
BMI range, *n* (%)	
<18.5	18 (2.4)
18.5–25	311 (41.8)
25–30	317 (42.6)
>30	98 (13.2)
Alcohol, *n* (%)	
>14 Units/week	90 (12.1)
<14 Units/week	654 (87.9)
Smoking, *n* (%)	
Current	256 (34.4)
Past	61 (8.2)
Never	407 (54.6)
Unknown	20 (2.8)

BMI, body mass index; cART, combined antiretroviral treatment; SD, standard deviation.

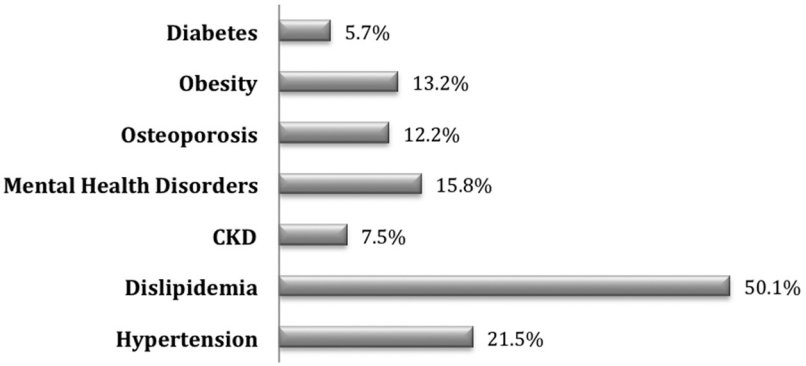

FIG. 1. Prevalence of major non-HIV-related comorbidities. CKD, chronic kidney disease.

Prevention and management of CVDs

Current guidelines recommend annual assessment of CVD risk in PLWH older than 40 using conventional CVD risk scores.[11,12] British HIV Association guidelines recommend using QRISK®2 score to estimate the 10-year risk of developing CVD as it showed better performance than the Framingham risk score (FRS) in the U.K. general population.[13] Given that both QRISK and FRS may underestimate the risk in PLWH,[14,15] in our center we perform computed tomography coronary artery calcium score (CACS) as an additional tool to detect and quantify subclinical atherosclerosis as we have shown that such strategy may improve CVD risk stratification and better inform decisions to start statin therapy in PLWH.[16]

Our local care pathway for the prevention and management of CVD in PLWH is illustrated in Figure 2. Overall, 52% of the study participants were in the low-risk category (QRISK <10% and CACS <50th centile for age and gender-matched controls) and suitable for general risk management and yearly CVD risk assessment; 35% were at intermediate risk (QRISK: 10%–19% or CACS 50–75th centile) and eligible for primary prevention with statins; 13% were at high risk of developing CVD (QRISK >20% or a CACS >75th centile) requiring high-intensity statin and aspirin unless contraindicated[17,18] and referred to a specialist cardiology consultation (Table 2). In addition, it was recommended that patients at intermediate to high risk had their cART regimens reviewed in favor of a more ''cardio-friendly'' regimen with a neutral metabolic profile and less impact on cardiovascular risk.

A high prevalence of traditional CVD risk factors such as dyslipidemia (50.1%), hypertension (21.5%), current smoking (34.4%), obesity (11.9%), and diabetes (5.8%) was observed in our cohort. This underscores the importance of primary prevention strategies to aggressively control modifiable risk factors in PLWH. To face the increased needs of this population, we implemented a specialist cardiology/HIV joint clinic as a new clinical service to deliver specialized care to PLWH with established CVD or high CVD risk in a timely manner.

Prevalence and management of bone disease

Current BHIVA guidelines recommend estimating fracture risk in HIV-infected men older than 50 years and in all postmenopausal women using the fracture risk assessment tool (FRAX). Bone mineral density (BMD) testing with dual-energy X-ray absorptiometry (DEXA) scan is recommended for those with increased fracture risk (FRAX major >10%).[12] We have recently reported that the use of FRAX alone without BMD testing, as per current BHIVA guidelines, may not offer an accurate estimation of the presence of osteoporosis in PLWH and may fail to detect a significant proportion of patients at risk of osteoporotic fractures.[19] Therefore, in our center, we recommend combining the assessment of fracture risk (with FRAX) with BMD by DEXA scanning every 3 years in all PLWH older than 50 years (Fig. 3). In our cohort, the prevalence of osteopenia (T-score between −1.0 and −2.5 SD at any site) was 63.7%, whereas osteoporosis (T-score less than −2.5 at any site) was diagnosed in 91 (12.2%) patients, more frequently detected at the spine (Table 3). FRAX scores (calculated considering HIV a risk factor for secondary osteoporosis and BMD results) were >10% in only 15 (2%) patients, of whom 9/15 had evidence of osteoporosis (Table 3). At their first clinic visit, 27 patients were on bisphosphonate treatment. Overall, we found a poor agreement between DXA scan results and FRAX scores as the majority of patients (76/91) with evidence of osteoporosis on the DXA scan had an FRAX major score <10% and therefore would not have been offered treatment if the DEXA scan had not been performed.[19] Low vitamin D levels were found in 62% patients [43% with vitamin D deficiency (<40 mmol/liter) and 57% with vitamin D insufficiency (40–70 mmol/liter)].

Treatment with bisphosphonates is recommended in patients with high fracture risk (FRAX score >10%), osteoporosis (T-score less than or equal to −2.5), or osteopenia (T-score less than or equal to −1 and greater than or equal to −2.5) in the presence of risk factors for osteoporosis and fragility fractures.[20,21] Patients with high fracture risk/osteoporosis should have their calcium and vitamin D levels assessed and optimized.[22] A careful review of cART and comedications is recommended to avoid drugs, for example, tenofovir disoproxil fumarate (TDF) especially in combination with protease inhibitors (PI), that could affect further BMD.[23] The recommended duration of bisphosphonate treatment is 3–5 years, after which a reassessment with a BMD scan is recommended. If T-scores remain below −2.5, and/or there are incident vertebral fractures, treatment should continue. If the patient has not experienced fractures before or during therapy and the fracture risk is low, a ''drug holiday'' can be recommended. Although there is no solid evidence, 1–2 years for risedronate, 3–5 years for alendronate, and 3–6 years for zoledronic acid are suggested. After this time, the patient should be reassessed. If a new fracture is experienced, or fracture risk has increased or BMD remains low (T-score less than or equal to −2.5), bisphosphonate treatment should be resumed.

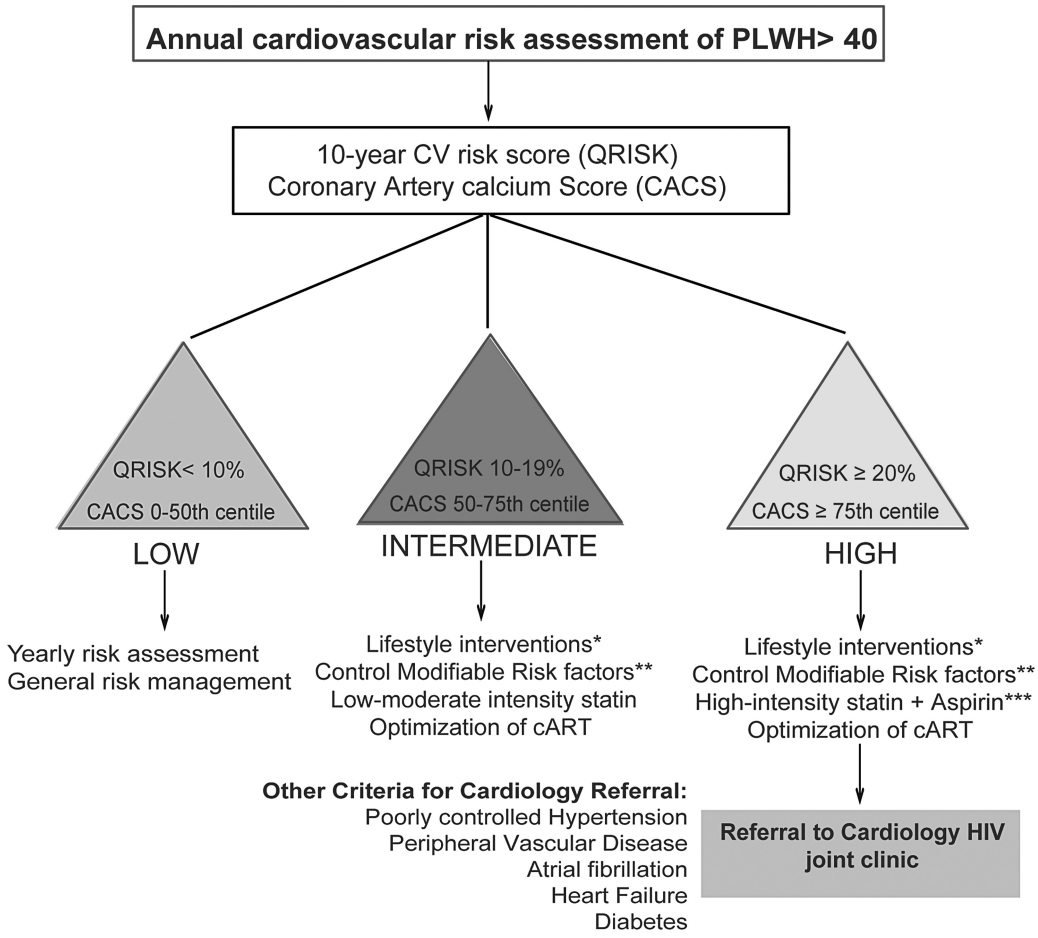

FIG. 2. Pathway for the assessment and management of CVD in PLWH older than 50 years. CACS, coronary artery calcium score; cART, combined antiretroviral treatment; CVD, cardiovascular disease; PLWH, people living with HIV.

Prevalence of metabolic and endocrine disorders

HIV infection and antiretroviral treatment are commonly associated with metabolic abnormalities, including dyslipidemia, disorders of glucose metabolism, and body composition changes.[24–26] Our local policy for screening for metabolic disorders includes annual assessment of BMI, fasting glucose levels, HbA1c, and a fasting lipid profile (Fig. 4). In this study cohort, the mean BMI was 25.9 (SD 7.7), 13.2% of patients presented with a BMI >30 kg/m^2 (obesity), 42.6% were overweight (BMI ≥25–30 kg/m^2), whereas 2.5% were underweight (BMI <18.5 kg/m^2). Diabetes and impaired fasting glucose were found in 5.8% and 10.3% of patients, respectively. PLWH with poorly controlled diabetes, obesity, or impaired fasting glucose were referred to the metabolic clinic, which was introduced as a specialist HIV clinical service to improve care delivery of patients with metabolic abnormalities, focusing on targeted lifestyle interventions to control weight and optimization of diabetes management.

Table 2. Distribution of QRISK® Scores and Coronary Artery Calcium Scores by Risk Prediction Categories

Cardiovascular risk assessment			
QRISK	n *(%)*	*CACS*	n *(%)*
0%–10%	383 (51.8)	<50th	494 (66.9)
10%–19%	260 (35.2)	50th to 75th	141 (19.1)
>20%	96 (13.0)	≥75th	104 (14)

CACS, coronary artery calcium score.

An increased prevalence of testosterone deficiency has been reported in men with HIV compared with men without HIV.[27,28] In our cohort, we found a prevalence of biochemical hypogonadism of 18.8%, defined by low serum total testosterone levels (<12 nmol/liter) or low free testosterone levels (<0.225 nmol/liter).[29] Sexual hormone-binding globulin (SHBG) levels were tested in 35.9% of patients, showing increased levels in 37.5%. Since SHBG levels are commonly increased in HIV-infected men and may affect total serum testosterone reading,[30] we recommend estimating free

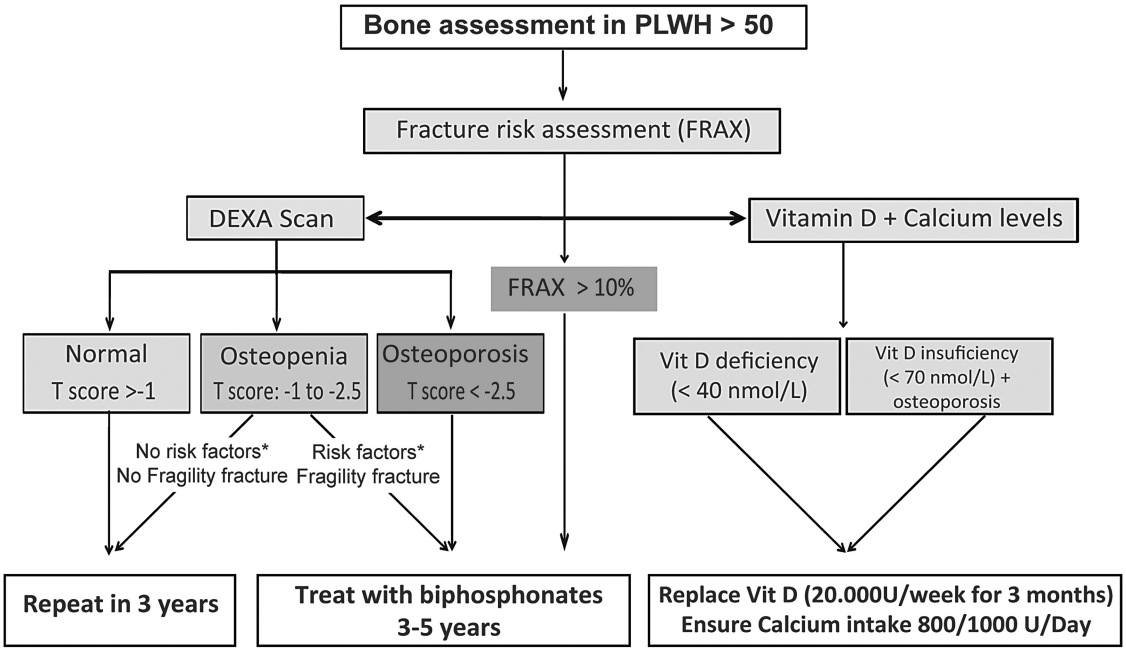

FIG. 3. Algorithm for the assessment and management of bone disease. BMI, body mass index, DEXA, dual-energy X-ray absorptiometry; FRAX, fracture risk assessment tool; Vit D, vitamin D.

testosterone levels using online available equations if testosterone deficiency is suspected. We have reviewed our local guidelines according to these results and we only recommend screening for hypogonadism in case of symptoms or signs suggestive of testosterone deficiency (such as low libido, erectile dysfunction, fatigue, or unexplained anemia).

In women living with HIV older than 50 years, we routinely assess for the presence of menopausal symptoms and postmenopausal complications such as osteoporosis and CVD. The diagnosis of menopause is based on clinical information (amenorrhea for at least 12 months in women aged >45 years, with or without vasomotor symptoms). As in women without HIV, laboratory investigations (such as follicle-stimulating hormone, FSH) are not routinely indicated in women living with HIV unless premature ovarian syndrome is suspected (in women younger than 40 years with menstrual irregularity and/or vasomotor symptoms).[31] In our cohort, 41/53 women were postmenopausal, 14.6% (6/41) had osteoporosis, and 31.7 (13/41) had 10-year risk of CVD >10% with 19.5% (8/41) showing significant calcification on CACS. A specialized menopause clinic was implemented at the CWH for advice on the management of complex menopausal symptoms, including hormone replacement therapy, nonhormonal treatments (such as antidepressants), and nonpharmacological treatments (such as cognitive behavioral therapy and lifestyle modifications).[32]

Prevalence and management of CKD

Current guidelines recommend screening all PLWH for kidney disease by eGFR and screening for proteinuria.[33] We found a prevalence of CKD of 7.5% among our patients,

Table 3. Prevalence of Bone Disorders and Vitamin D Status

DXA results (T-scores)	*Normal*	*Osteopenia*	*Osteoporosis*
Femoral neck, *n* (%)	353 (47.4)	366 (49.2)	25 (3.4)
Lumbar spine, *n* (%)	354 (47.6)	307 (41.3)	83 (11.1)
Any site, *n* (%)	179 (24.1)	474 (63.7)	91 (12.2)
FRAX scores	*Major <10%*		*Major >10%*
	729 (97.9)		15 (2.0)
Vitamin D levels	*Normal (>70 mmol/liter)*	*Insufficiency (40–70 mmol/liter)*	*Deficiency (<40 mmol/liter)*
n (%)	262 (37.9)	244 (35.4)	184 (26.7)

DXA, dual-energy X-ray absorptiometry; FRAX, fracture risk assessment tool.

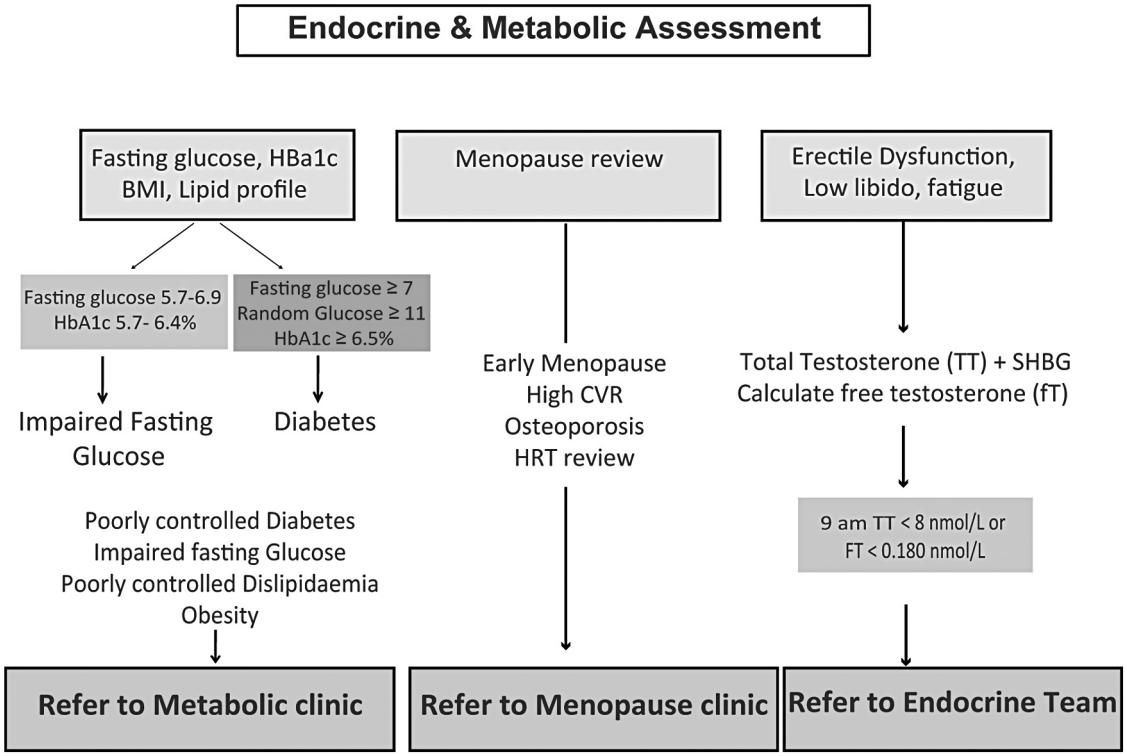

FIG. 4. Screening pathway for endocrine and metabolic disorders. CVR, cardiovascular risk; FT, free testosterone; HbA1c, hemoglobin A1c; HRT, hormone replacement therapy; TT, total testosterone.

which concurs with the overall CKD prevalence in PLWH.[34] A cospecialty HIV/renal clinic was also set up for advice on the management of patients with complex renal problems.

Cancer screening

In keeping with the U.K. national guidelines,[35] our local cancer screening pathway (Fig. 5) recommends that all women living with HIV between 25 and 65 years of age should have cervical screening performed annually. There is no evidence that HIV-positive women are at higher risk of breast, uterine, or ovarian cancers, and therefore, screening for breast cancer and other cancers should follow the national guidelines for HIV-negative women.

Cancer screening in men should follow the same recommendations for HIV-uninfected populations and generally undertaken by the general practitioner (GP) (Fig. 5). Overall, 664 patients had a prostate-specific antigen (PSA) screening test. Total serum PSA levels were interpreted according to age-related cutoffs,[36,37] and a referral to the urology service made if levels were above the age-specific threshold (Fig. 5). In our cohort, 43 (7%) patients presented an abnormal PSA for their age, of which 17 (2.6%) were diagnosed with prostate adenocarcinoma.

Mental health disorders and neurocognitive assessment

PLWH are at increased risk of developing mental health problems compared with the general population leading to excess morbidity and poorer health outcomes.[38] Screening for depression and/or anxiety disorders was done using the Patient Health Questionnaire for depression (PHQ-9)[39] and the Generalized Anxiety Disorder questionnaire (GAD-7)[40] and reported by 15.7% of our patients. Patients whose screen suggested significant mental health problems were offered psychological assessment and support in a stepped care approach.

Memory was assessed with the revised everyday memory questionnaire (EMQ-R)[41] and patients with abnormal scores were referred to psychology for neuropsychometric testing and to the specialist neurology clinic for PLWH when further assessment was needed.

Polypharmacy, multimorbidity, and frailty

A systematic review of polypharmacy and potential DDIs between cART and comedications was performed in this clinic, favoring a drug deprescription strategy in the management of polypharmacy whenever possible (Fig. 6).[42] In particular, we estimated the anticholinergic burden, since it may predict increased prevalence of side effects, falls, and cognitive decline.[8] The overall prevalence of polypharmacy and multimorbidity in our cohort was 46.6% and 69.3%, respectively. Heavy polypharmacy (≥10 medications) was present in 30/744 (7.9%) patients. The most frequently prescribed drug classes were as follows: statins (46.1%), antihypertensives (33.3%), antidepressants (15.9%), and proton pump inhibitors (10.8%).

Frailty assessment was performed in the first clinic visit using the Rockwood Frailty Index.[43] Patients with a Rockwood frailty score of 3–4 were referred to the local Living Well pathway to optimize risk factors, improve diet, and exercise. Patients with higher frailty scores were referred to a

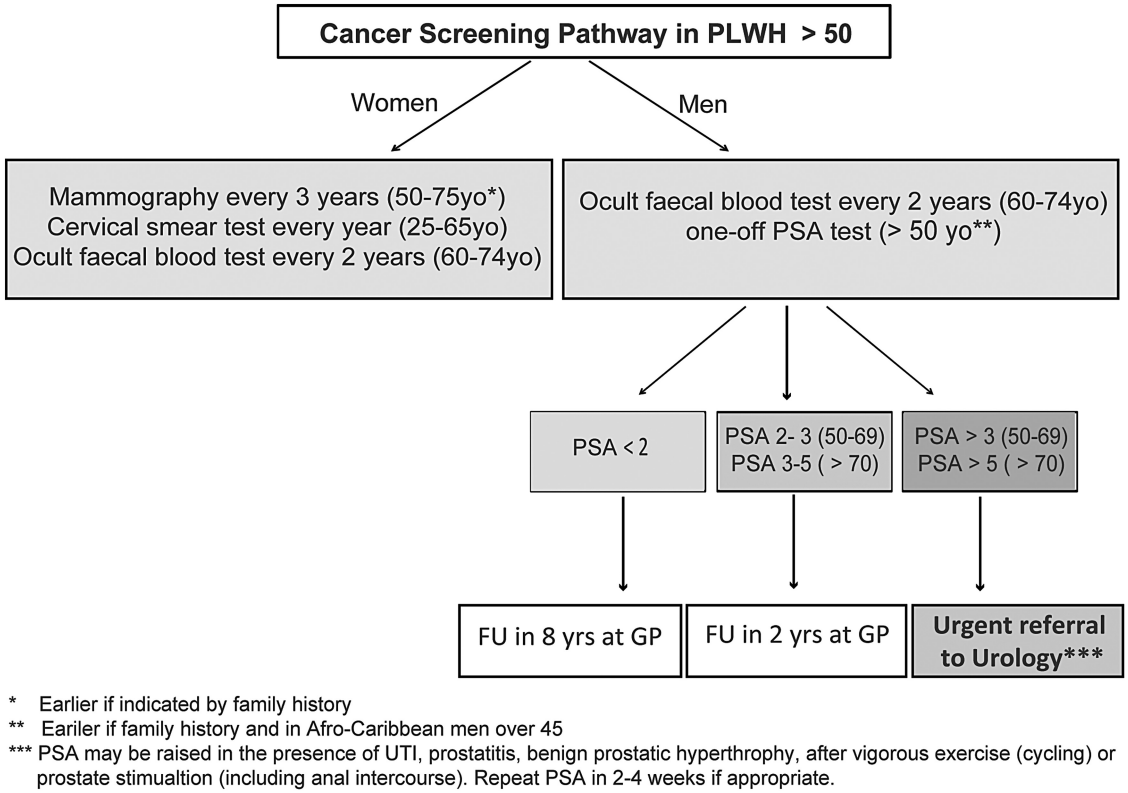

FIG. 5. Cancer screening pathway. FU, follow-up; GP, general practitioner; PSA, prostate-specific antigen; UTI, urinary tract infection.

specialized HIV/geriatric clinic run by HIV specialists together with geriatric consultants (Fig. 6). The aim of this clinic is to recognize early and intervene aggressively to delay or prevent permanent debility and frailty in PLWH. In line with this, mildly and moderately frail patients (Rockwood scores 5–6) are often the patients who benefit the most from this service where interventions are targeted to minimizing risk factors, preventing falls, reducing social isolation, and ultimately delay the progression of frailty.

Discussion

A demographic shift in PLWH is already visible,[5,6] and HIV services must be designed to reflect the changing needs of an aging population living with HIV and overcome a fragmentation of HIV care delivery.[44,45] In practice, the prevalence of noninfectious comorbidities is increasing as this population ages leading to frequent referrals to multiple specialist services, adding an economic burden and risking a

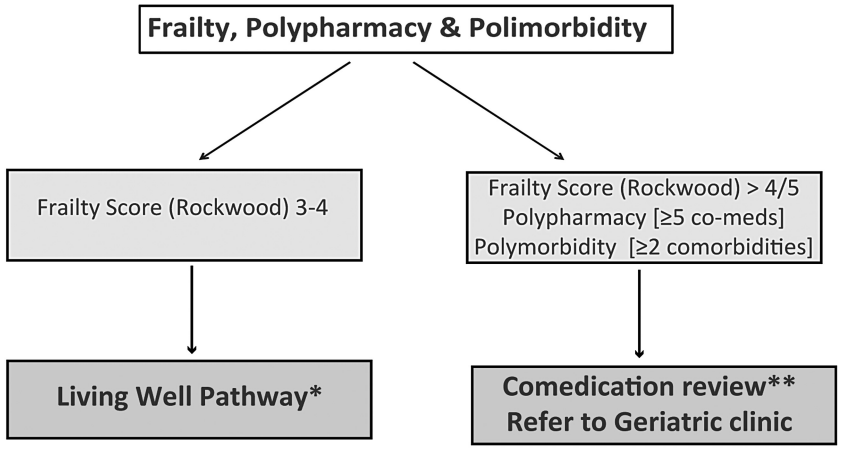

FIG. 6. Screening pathway for polypharmacy, multimorbidity, and frailty.

* In collaboration with dietitian and physiotherapist to reduce weight, improve exercise and diet
** Check for DDis with HIV drugs (www.hiv-druginteractions.org) and estimate anticholinergic risk. Check doses and inappropriate prescribing according to Beers criteria

fragmented care. To deliver an integrated patient care, a multidisciplinary clinic for PLWH older than 50 years was implemented in January 2009.[10] The results of a service evaluation after 10 years of experience of this clinic indicate a high prevalence of noninfectious comorbidities that largely concurs with similar studies on this topic.[2,3,7]

Pathways for the assessment and management of major comorbidities in PLWH were revised according to these data and led to the implementation of the following: (1) a dedicated ''aging PLWH'' clinical pathway to be introduced into the routine clinical practice in all HIV outpatient services under the remit of CWH; and (2) new joint HIV/specialty clinics (cardiology, nephrology, neurology, metabolic, menopause, and care of the elderly clinics) to deliver specialized but integrated care to patients in a timely manner. These are multidisciplinary clinics run by an HIV physician in conjunction with specialists in different areas of care delivery using a one-stop clinic approach. The aim is to provide integrated medical advice and joint team decisions in one single patient visit, decreasing delays in treatment initiation and reducing the number of hospital visits. Furthermore, these services provide specialized training to non-HIV physicians on HIV-related care and on the management of age-related diseases to HIV physicians. Referrals to cospecialty clinics can be done by HIV physicians or nurse practitioners or by GPs. Communication with GPs is crucial for the optimal management and follow-up of these comorbidities and to clarify questions about possible concerns around DDIs. A restructuration of HIV health care services is already in place as we believe that HIV patient care in the future will rely on coordinating services to manage HIV-related and nonrelated comorbidities in partnership with other specialties, GPs, care homes, and others. The use of telemedicine services for managing both comorbidities and HIV as a chronic condition could be a way of expanding the access to specialized care by removing geographical barriers and promoting retention in care. While the use of telemedicine has been limited by complex regulations, these services are now widespread as a consequence of the COVID19 pandemic and should be explored as an effective way of delivering specialized care in the future.

Although consistent evidence may be lacking to fully support the hypothesis of premature aging of PLWH, studies have shown that PLWH may present with typical age-related comorbidities 10–15 years earlier than the general population.[46] Several HIV-specific and non-HIV factors may contribute to accelerated aging of PLWH, including chronic inflammation and immune senescence, HIV itself, and toxicity associated with long-term cART.[47,48] However, there may be potential confounders as PLWH are overexposed to behavioral risk factors (e.g., smoking, alcohol consumption, and recreational drug use) and coinfections (e.g., hepatitis C virus, cytomegalovirus).[49,50] We found a high prevalence of cardiometabolic disorders in our cohort including dyslipidemia (50.1%) and hypertension (21.5%), as well as behavioral factors such as smoking (36.9%) and obesity (11.9%). This may indicate the need to introduce lifestyle interventions to reduce modifiable risk factors at an earlier age. On the contrary, it is expected that the number of patients with geriatric syndromes characterized by complex multimorbidities, polypharmacy, and frailty will increase in future years[7] as well as the proportion of nursing home residents living with HIV. Early medical interventions are key to improve health outcomes and reduce hospitalizations and mortality. Furthermore, the needs of specific subgroups of PLWH, such as those admitted to long-term care institutions or those with physical and mental incapacities, should be carefully evaluated and a continuous effort to coordinate HIV service providers will be required. In line with this, we have implemented an HIV complex patient virtual clinic, consisting of a multidisciplinary team involving HIV physicians, psychiatric liaison nurses, social care workers, and community nurses with the aim of discussing complex social, psychological, or other health issues that require coordination of care or community HIV nursing input.

This study is limited by its retrospective nature and by the analysis of a single cohort, limiting the generalizability and reproducibility of the results. This is further reduced by the underrepresentation of women and nonwhite race. This study is also limited by the cross-sectional design, and therefore, we could not assess clinical outcomes. Furthermore, we mostly captured the prevalence of comorbidities of interest and may have failed to detect other common comorbidities such as liver disease. Finally, the definition of comorbidities, although standardized in cohort studies, may overestimate disease condition. This is the case for dyslipidemia or hypertension, where use of statins or antihypertensive drugs was used as diagnostic criteria.

Conclusion

The results of our analysis revealed significant rates of non-HIV-related comorbidities in PLWH older than 50 years and underscored the need for restructuring the model of HIV care favoring the prevention of comorbidities to reduce the burden of complex multimorbidity in older people with HIV. Efforts were made to standardize the care and implement clinical pathways targeted to the aging patient into routine HIV clinical practice. Referral pathways and novel HIV cospecialty services offering efficient and multidimensional care were implemented to meet the needs of a population living and aging with HIV.

Authors' Contributions

All authors were involved in designing the study, analyzing of data, and writing and revising the article.

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Author Disclosure Statement

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