

## HIV Co-Morbidities and Multi-Morbidities

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### Abstract

The co-morbidity and multi-morbidity observed in individuals afflicted by HIV infection is veritably overwhelming, extending as it does from obesity/overweight and metabolic syndromes, through chronic cardiovascular disease and dysfunctional immune systems, to serious loss of integrity of brain and central nervous system and the concomitant disruptions of cognitive function and affective status. Thus, it comes as no surprise that HIV patients report depressiveness and anxiety accompanied by lapses in memory performance and retention, sleeplessness, emotional disturbance, decline in mental health syndromes and the mismanagement of pain. These disorders may be exacerbated by smoking and alcohol problem that accelerate further the health and well-being of HIV-infected patients.

**Keywords:** HIV; Infection; Co-morbidity; Multi-morbidity; Loss of health

Several challenges confront those patients living and growing older with HIV disease with regard to non-communicable diseases, including cancer, addictive behaviors, fracture prevalence, heart disease and affective disorders, that present physical and mental health problems among the HIV positive [1-5]. Indeed, frailty and a conglomeration of behavioral risk factors are associated with multisystem co-morbid vulnerability that predict survival and multi-morbidity incidence among patients [6,7]. In a cohort of Romanian HIV patients, Streinu-Cercel et al. [8] observed moderately high prevalence of chronic renal disorders accompanied by moderately low occurrence of osteopenia and osteoporosis in comparison with these patients from other European countries with smoking addict an important risk factor renal and cardiac conditions, as well as impaired bone metabolism [9], for further bone health co-morbidities). Bolduc et al. [10] have listed several medical complications and multi-morbidities accompanied by multiple infection risk, including *Pneumocystis jirocii*, pneumonia, candida esophagitis, toxoplasmic encephalitis, tuberculosis, cryptococcal meningitis, disseminate *Mycobacterium avium* complex, and cytomegalovirus retinitis, as well as 'wasting' syndrome and HIV-encephalitis. According to the definitive study performed by Kilbourne et al. [11] among the most commonly observed HIV comorbidities presented by patients are to be included: oral candidiasis (21%), peripheral neuropathy (16%), and herpes zoster (16%) whereas those general medical comorbidities involved chemical hepatitis (53%), hypertension (24%), and hyperlipidemia (17%) with neuropsychiatric comorbidities offering a greater burden of disease among HIV-infected patients indicating that 32% of patients presented anxiety, 4% mania, 4% schizophrenia, and 11% cognitive impairment/dementia although estimations seem bedeviled by variations in symptom expression [12]. The seriousness of these latter cognitive deficits appears to constitute an especially heavy burden for everyday functioning and quality-of-life parameters [13,14]. The etiopathogenesis of the neuropsychiatric comorbidities, most particularly depressiveness and mood disorders, among HIV-infected patients affects deleteriously and markedly the quality-of-life, medication compliance, and disease prognosis in those afflicted; not least of all, the prevailing relationships between HIV-related stigma, HIV-disclosure, social support networks, and mood and depression among patients await description and expression [15]. The situation is rendered even more serious in view of the inadequacy of certain regional public health medical services especially among minorities and vulnerable groups that require more effective health practices and long-term policies [16].

The presented HIV symptoms were shown to be linked to the severity of illness and chance for survival despite the observed patients'

severity of depressive symptoms [17-21]. Among Zimbabwean patients, Magodoro et al. [22] have demonstrated an enormous burden of both co-morbidity and multi-morbidity through non-communicable among HIV-infected patients within high HIV and low income settings. The estimated health status of HIV patients affects negatively the influence of emotional and psychological well-being-health dimensions under consideration [23]. Patients presenting deteriorated conditions of health in comparison with that shown in the previous year expressed greater levels of tension/anxiety, depression/dejection, fatigue/inertia in addition to confusion/bewilderment behavior. Disorder staging as well as the type of mood state were found to be independent parameters of psychological distress and a function of highly dangerous recruitment induction linked to negative affective states and lack of impulse control [24]. Bengtson et al. [25] have observed that among HIV-infected patients depressive symptoms and mood disorders were presented as commonplace conditions with prevalence and responsiveness to antidepressant medications determined by ethnic and gender variables. Furthermore, marked negative correlations have been obtained between daily dietary intakes of healthy ingredients, including zinc, selenium, and vitamin C with neuropsychiatric and psychological health outcomes, such as depressiveness, anxiety, mood state and stress responsiveness expressions reported in Iranian HIV-patients [26]. In this context it must be borne in mind that HIV-disease progression as well as the perceptions of deteriorations in health may induce further risk-taking behaviors and other forms of neuropsychiatric aberration, such as addictive behaviors [27-30]. Consequently, it seems no surprise that risk-analyses for suicidal behaviors are affected: with on-going real suicide risk, defined for occurrence during the final month, displayed an incidence of 18% of of the patients in the HIV-positive cohort and no incidence in the HIV-negative cohort [31]. Finally, elevated levels of plasma pro-inflammatory cytokines induce the progression of depressive disorders and depressive-like behaviors in the HIV-afflicted patients with the onset of co-morbid depression leading

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to the deterioration of rates of CD4+ cell counts and an elevated plasma viral load [32]. In this regard, both the neurobiological and psychosocial influences upon disorder progression exert essential hallmarks of consequence for the eventual clinical management of HIV-disorder and the prognosticated prevention of HIV disease evolution among patients.

It seems unfortunate to observe that individuals presenting one or more chronic condition, e.g. HIV-positive/other inflammatory disorders, evidence a singular lack of habit-reduction, compared with those presenting chronic conditions, regarding cigarette smoking which was found to be particularly high also among those reporting anxiety, depression, and substance abuse [33]. In several countries the proportion of HIV-infected individuals who smoke has been found to be disproportionately high in comparison with taken from the general population [34] with accompanying lung cancer incidence [35,36], diabetes and cardiovascular complications [37-40] with resultant accelerations of the ageing process [41]. Poly-tobacco usage was shown to be above that shown by the general population [42-45] and is often accompanied by neuroimmune dysfunction [46] and reproductive issues [47-49]. Cortical regional neuroimaging demonstrated the greatest volumetric alteration related to aging and HIV-infection and smoking and/or alcohol liability. Within the cohort of HIV+ patients, cortical volumes were linked to their neuroimmune history whereas subcortical alterations were correlated with ongoing neuroimmune functioning. Furthermore, cognitive functioning was associated primarily with the observed differences in cortical volume alteration. All these expressions of a highly self-destructive addictive propensity have been addressed for the purpose of deriving preventative measures [50], which is singularly a necessity especially in view of the remarkably high incidence of smoking behavior among individuals living with HIV, a situation likely to reduce the efficacy of HIV treatment thereby leading to markedly high morbidity and mortality. HIV-infected smokers remain a greater risk for a multiplicity of HIV-associated infections and non-HIV related morbidity, such as reduced responding to antiretroviral treatment, impaired immune functioning, reduced cognitive functioning, decreased lung functioning, and cardiovascular disease [51]. Finally, Hasse et al. [52] have demonstrated that the multi-morbidity expresses greater prevalence and incidence among HIV-positive patients in comparison with HIV-negative patients with smoking, but not HIV-status, maintain a powerful impact upon cardiovascular risk-situation and the presence of multi-morbidity.

There exists also a remarkably high prevalence dyslipidemia, diabetes and obesity, possibly due to antiviral treatment side-effects [53,54], as well as hypertension, among HIV-infected sufferers [55,56], all contributing to ageing acceleration and increased mortality [57]. Metabolic disorders among HIV patients appear to be on the increase, perhaps alarmingly so among Hispanic Americans [58] and other ethnicities [59]. Price et al. [60] have obtained a tendency towards an increasing prevalence of metabolic syndrome and elevated risk for cardiovascular disorders among HIV patients in spite of the ageing population sample and lengthened duration of HIV-infection period and extended antiviral therapy over the course of one year. Gomes et al. [61] found that, among a large cohort of Hispanic American HIV patients receiving antiviral therapy, significant proportions were either obese or overweight or on their way to developing obesity as well as diabetes mellitus. Reorientations of health care procedures are necessary for patients living with HIV in view of the exaggerated prevalence of overweightness and abdominal obesity linked to sociodemographic and clinical conditions expressed by the consumption of risk foods [62]. Similarly, HIV patients with high with CD4 counts receiving antiretroviral treatment displayed marked increases in body mass index, overweight/obesity, and central obesity among patients but

Year	Co-morbid expression	Without Antiviral	With antiviral
2016	Diabetes mellitis	Abebe et al. [66] <sup>1</sup>	
2016	Diabetes + Obesity	Gomes et al. [61] <sup>1</sup>	
2016	Chronic pain	Merlin et al. [67]	
2016	Respiratory tract inflamm <sup>2</sup>	Bates et al. [76]	
2016	Opiates+Anx-Depr <sup>3</sup> +CVD <sup>4</sup>	Zippel-Schultz et al. [68]	
2016	Dengue virus infection	Thisyakorn et al. [49]	
2016	Dyslipiddemia	Streinu-Cercel et al. [8]	
2016	Toxoplasmosis and toxocar <sup>5</sup>	Schurer et al. [69]	
2016	Extrahepatic conditions		Soriano and Berenguer [70]
2014	Frailty syndrome		Guaraldi et al. [1]
2016	Multiple co-morbiditiess		Treskova et al. [71]
2016	PAH <sup>6</sup>		Renard et al. [72]
2015	RTD <sup>7</sup>		Chadwick et al. [73]
2015	Chronic hepatitis C		Coppola et al. [74]
2014	Liver fibrosis		Rochstroh et al. [75]

**Table 1:** Variations among co-morbidities and multi-morbidities presented by HIV patients with or without antiviral treatments. **Note:** <sup>1</sup>pre-antiviral treatment; <sup>2</sup>Inflammation; <sup>3</sup>Anxiety and Depression; <sup>4</sup>Chronic cardiovascular disease; <sup>5</sup>toxoplasmosis and toxocarasis; <sup>6</sup>Pulmonary arterial hypertension; <sup>7</sup>Renal tubular dysfunction.

not those with higher CD4 counts, implying that obesity risk was exacerbated by lower CD4 counts [63]. It is worth noting that in the Hispanic cohort (above) of HIV patients receiving antiviral therapy the incidence of obesity/overweight was similar to that witnessed in high income countries with the expected accompanying risks [61]. Further, Obesity linked to commonplace among HIV-infected Nigerians maintaining antiretroviral therapy [64].

In conclusion, affliction with the HIV condition implies a multiplicity of co-morbidly-associated disorders covering a plethora of somatic and neuropsychiatric loss of health. As shown in Table 1, the spectrum of co-morbidities/multi-morbidities associated with HIV is prodigious. In order for HIV patients to retain/regain their capability and complete/partial ability to be work-employed their performance is primarily dependent upon attaining viral suppression, the absence of somatic/psychiatric co-morbidity, and psychosocial factors that enhance well-being [65]. Within this context, physical exercise was shown to promote multifaceted improvements over several health parameters thereby contributing to greater well-being and quality-of-life.

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