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Neuropsychiatric aspects of HIV infection among older adults

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Abstract

Treatment advances such as the advent of highly active antiretroviral therapy (HAART) have translated into greater life expectancy for HIV-infected individuals, which will ultimately result in a “graying” of the HIV/AIDS epidemic. In addition, older individuals are engaging in a higher rate of high risk behaviors than had been previously expected. As such, study of older HIV-infected patients, including study of the psychiatric and neurocognitive aspects of the disease, appears highly indicated. Epidemiological studies have demonstrated that HIV infection is associated with higher rates of several psychological/psychiatric disorders when compared to general population base rates. There is also a rich literature that has documented the adverse neurocognitive effects of HIV infection, ranging from subtle cognitive complaints to frank dementia, among younger adults. Although it has been hypothesized that older age may potentiate the deleterious effects of HIV infection, little is actually known, however, regarding the incidence, prevalence, course, and clinical features of HIV-associated psychiatric and cognitive dysfunction among older adults. This article provides an overview of the epidemiology and clinical manifestations of HIV-associated cognitive and psychiatric disorder across the age spectrum, with particular focus on what is known regarding the interaction of advancing age and HIV infection. Future directions for research are suggested, including basic epidemiologic study of incidence and prevalence rates of neurodisease among older HIV-infected adults as well as investigations designed to determine whether the nature, severity, course, or treatment of such disorders differs among older versus younger patients.

Keywords

HIV infection; Older adults; Neuropsychiatric aspects

1. Introduction

Little is known of the incidence, prevalence, course, and phenomenology of psychiatric disorder in older HIV-1 infected adults. The extant literature on the neuropsychological aspects of HIV-1 infection has primarily focused on cognitive functioning in younger adults to the relative exclusion of older individuals. Also, while researchers have accumulated considerable data regarding the characteristic cognitive consequences of HIV-1 infection, less is known

about the attendant neuropsychiatric changes that often accompany the disease. Despite the paucity of relevant studies in the research literature, neuropsychiatric symptoms and syndromes ranging from major depressive disorder to apathetic and irritable mood are frequently present among HIV-infected individuals [1–6]. These symptoms may be either a primary consequence of the central nervous system (CNS) effects of HIV disease, a reaction to the losses (particularly bereavement), frustrations, and stigmatization sometimes associated with living with HIV/AIDS, or an admixture of these factors [7–9]. Also, although psychiatric symptomatology may occur as a *consequence* of HIV disease, it may also be a *risk factor* for contracting HIV and its presence may precede actual infection. For example, research has clearly shown an elevated rate of HIV-1 infection among the severely mentally ill [10], and some studies have reported elevated rates of psychiatric disorders among gay/bisexual men, substance users, and lower SES members of ethnic minority groups, independent of HIV serostatus.

In this article we will first provide an overview of common HIV-associated neuropsychiatric disorders among younger adults and then briefly touch upon psychiatric disorder among HIV seronegative elders. We will then summarize what is known about the neuropsychiatry and neuropsychology of HIV infection among older adults, and conclude by pointing out several gaps in our knowledge that future research should address.

2. Neuropsychiatric features of HIV infection

As noted above, psychiatric dysfunction may precede infection with HIV or develop as a direct (e.g., effect of the virus in the CNS) or indirect (e.g., reaction to loss, bereavement) consequence of the disease. Below, we briefly review prevalence data for both major psychiatric syndromes (e.g., major depressive disorder and bipolar affective disorder) and for more subtle neuropsychiatric alterations in personality and relational style including apathy and irritability.

2.1. Depressive spectrum disorder

Both major depressive disorder and subsyndromal depressive symptomatology are more prevalent among HIV-infected individuals than among the general population, a finding that consistently emerges across continents and HIV risk groups [1,3,5,6,9,11,12] (see Table 1). Satz and colleagues [12] reviewed studies of major depressive disorder (MDD) in HIV infection and found HIV+ individuals were from two to seven times more likely to meet diagnostic criteria for current MDD than were men of similar ages in the general population. Also, nearly one in four HIV+ men (averaged across eight studies) had experienced MDD at some time in their life (compared to 3–7% of similar aged men in the general population). A study by Bix (not included in the Satz et al. review) reported rates of current MDD as high as 20% [13]. Rates of depressive disorders may vary as a function of disease stage. Atkinson and colleagues [1] found that 65% of persons living with AIDS met diagnostic criteria for MDD; the majority of these patients had a previous diagnosis of a depressive disorder preceding their infection with HIV-1. Lower rates of MDD were found among patients who had not progressed to AIDS. Most studies of depression in HIV-1 have not used structured diagnostic interviews to define psychopathology but rather self-report (e.g., the Beck Depression Inventory) [14] or clinical rating scales to measure depressed mood level (e.g., the Hamilton Rating Scale for Depression) [15]. These studies generally report at least moderately elevated rates of depressive symptomatology among HIV+ subjects relative to noninfected controls. In fact, when such rating scales are used, estimates of “clinically significant” depression rise dramatically among HIV-infected individuals, approaching 50% [5,9].

2.2. Mania

There is accumulating empirical support for the contention that there are heightened rates of bipolar affective disorder and secondary mania among individuals with HIV/AIDS [16–18].

Secondary mania seems to occur in only a minority of patients (i.e., <%), often in the later stages of HIV infection, but can have extremely untoward personal and public health consequences. When MRI of the head is negative for abnormalities and in earlier stage disease, lithium carbonate may be chosen, and is reasonably well tolerated with low dosing and careful follow-up with blood levels. Caution should be taken regarding neurologic side effects (ataxia, tremor), diarrhea (very common), and other causes of dehydration, as well as renal function (particularly due to the potential for HIV-associated nephropathy). These effects are important to identify to make dosage adjustments to reduce toxicity. Frequently in late-stage patients, there may be concomitant cognitive–motor impairment and a greater liability to lithium toxicity. If MRI of the head is positive for abnormalities, and when lithium toxicity is a clinical concern, anticonvulsants might be preferred [19] (e.g., divalproex sodium or carbamazepine). For neuroleptic management, the atypical antipsychotics (e.g., risperidone and olanzapine) are typically considered the first-line medications [20]. HIV neurotoxicity may play a prominent role in the pathogenesis of at least some cases of secondary mania among HIV+ persons, as there is some evidence that CNS-penetrating antiretroviral medications confer some protection against mania [17]. Manic behavior, including increased sexual activity, heightened drug use, and engaging in higher risk sex acts, is a risk factor for contracting and transmitting HIV.

2.3. Anxiety

Similar to the findings noted above regarding affective disorders, multiple studies have demonstrated that rates of anxiety disorder are elevated among both HIV+ populations and among seronegative members of several major HIV risk groups, including men who have sex with men and substance abusers [21]. A recent 2-year longitudinal study of 173 homosexual men infected with HIV and 84 homosexual seronegative men found rates of anxiety disorders between the two groups did not differ, but did greatly exceed those found in the general population. Among HIV+ individuals, anxiety disorder was related to HIV-related symptoms of fatigue and physical dysfunction [21]. Along related lines, the presence of persistent focus on death and mortality issues has been found to be much more common among HIV+ patients in the symptomatic stages of the disease [22]. Some recent studies have suggested that a PTSD syndrome can develop *in response* to HIV diagnosis or diagnosis with other potentially life-threatening illnesses [23,24]. Such PTSD syndromes are more likely to occur in patients with other psychiatric diagnoses and/or pre-HIV history of exposure to other traumatic events [23].

2.4. Psychotic disorders

Psychotic symptoms may be seen in HIV populations due to several factors. First, the severely or persistently mentally ill (e.g., schizophrenia) are at high risk of HIV infection because of elevated likelihood of a comorbid substance use disorder, high rates of multiple anonymous partners, and bartering for sex [25]. As the population with schizophrenia ages, it is likely this cohort will assume a larger proportion of the HIV-infected elder population. Finally, HIV infection itself may be associated with psychotic symptoms [26]. Prevalence rates range from less than 0.5% to nearly 15%, depending upon the method of surveillance [26]. Generally, such symptoms occur in later stage illness, so the differential diagnosis must always consider delirium. The presentation is highly variable, but delusions with persecutory, grandiose, or somatic themes are common. Auditory, and to a lesser degree visual and olfactory, hallucinations are also prominent. The pathogenesis of psychosis due to HIV infection is unclear. There is speculation that subcortical neurodegeneration due to HIV itself or concurrent viral infections may be partly responsible, and there is a trend for such patients to have had prior histories of methamphetamine use disorders, leaving open the possibility that persistent amphetamine-associated neurotoxicity may heighten vulnerability [27].

2.5. Other neuropsychiatric disorders

Apathy is the simultaneous reduction in goal-directed thoughts, behaviors, and emotions due to diminished motivation and is frequently seen in CNS disorders that disrupt frontal–subcortical connections [28]. Persistent and pronounced apathy occurs with surprising frequency among HIV+ patients [29,30]. Although apathy is often mistakenly considered solely a symptom of a depressive disorder, research in HIV/AIDS as well as other neurological diseases has shown that apathy can reliably be discriminated from depression, and can exist independent of a depressive syndrome [31,32]. Another common symptom seen in HIV infection is increased irritability. Irritability has been shown to be a frequent sequelae of neurological insult, including injury to prefrontal or subcortical structures or fronto-subcortical projections [33,34].

2.6. Psychiatric disorder among HIV/AIDS substance users

Increasing numbers of substance users, both injection and noninjection drug users, are becoming infected with HIV [35–37]. Studies of the prevalence of substance use disorders among currently infected individuals show life-time rates as high as 40–50% (e.g. [38,39]). HIV-infected substance users may be at particularly elevated risk for experiencing psychiatric disorder, particularly depressive disorder comorbidity [36,40,41]. A recent 3-year longitudinal study by Johnson and colleagues [40] reported that among HIV+ intravenous drug users, rates of MDD were dramatically elevated relative to population base rates and that fully 90% of those patients who had MDD at baseline experienced at least one subsequent depressive episode during the 3-year follow-up period.

2.7. General treatment issues

Pharmacological interventions can be extremely useful in all major psychiatric disorders associated with HIV infection in younger populations, and it is likely that the same will be true for elder individuals. Nevertheless, it is thought that, on average, psychiatric disorders with later age of onset or those associated with more severe comorbid medical illness may have overall lower response rates to standard treatment than comparable conditions in younger, physically healthy populations. Whether this is the case with elders infected with HIV is, of course, unknown, but an obviously important area for research. The rules of geriatric psychopharmacology prevail, with some additional caveats warranted by the possibility of drug–drug interactions of psychiatric medications and antiretroviral therapies. The primary rules are to “start low and go slow” (start at low doses of the chosen therapy, and advance the daily dose slowly). The second rule is to choose agents with lower risk of adverse side effects. The third is to simplify dosing schedules to once or twice daily whenever possible. Both these latter two rules enhance likelihood of adherence. Guidelines regarding the pharmacological treatment of common HIV-associated neuropsychiatric disorders follow.

Anxiety is prevalent in the context of discovery of sero-conversion, and may be high at transition points in HIV illness (see [42]), such as of progression to AIDS, or sudden failure of antiretroviral therapy to control “viral load.” Short-term use of benzodiazepines (e.g., diazepam—Valium 2.5 mg to 20 mg daily or lorazepam—Ativan 0.5 mg to 4 mg daily) customarily for 1 to 4 weeks can help manage anxiety due to acute life stress.

Major depressive episodes routinely respond to standard first generation antidepressants (e.g., tricyclic antidepressants like nortriptyline or desipramine), but most clinicians prefer the newer selective serotonin uptake inhibitors (SS-RIs, such as fluoxetine—Prozac, paroxetine—Paxil, sertraline—Zoloft) or the selective serotonin noradrenaline reuptake inhibitors (SNRIs, such as venlafaxine—Effexor) because of their more favorable side effect profiles (see [43,44]). Of the newer antidepressant drugs, sertraline, citalopram—Celexa, and venlafaxine are commonly chosen because of their minimal inhibitory effects on the enzyme systems metabolizing

antiretrovirals, with resulting low likelihood of drug–drug interactions. Given that tricyclic antidepressants have been shown to have a beneficial effect on pain, clinicians may also want to consider their use with depressed patients who are also experiencing pain from common maladies such as peripheral neuropathy.

Manic episodes, either due to bipolar disorder or to HIV infection, appear to respond well to standard mood stabilizer treatments (e.g., lithium, carbamazepine—Tegretol, valproate—Depakote) (e.g., see [16]). Some experience suggests that lithium may not be tolerated by patients at later stage HIV illness, particularly those with abnormalities on neuroimaging or neuropsychological testing, as well as valproate or carbamazepine [16]. Special attention to this matter may be needed for the elder individual with HIV.

Psychotic disorders due to HIV appear to respond reasonably well to antipsychotic treatment. Here, many clinicians prefer the newer so-called atypical neuroleptics such as risperidone—Risperdol and olanzapine—Zyprexa, based on their more favorable side effect profile compared to standard first generation antipsychotics such as chlorpromazine—Thorazine or haloperidol—Haldol. Even in younger HIV-infected persons, response is often seen at one-quarter to one-half the usual dose of antipsychotic required for treating schizophrenia in comparably aged populations [27]. Side effects of antipsychotics (e.g., extrapyramidal symptoms) are very prevalent, and often a dose-limiting side effect in HIV populations. Thus, elder persons with HIV-associated psychosis may respond to lower dosages or be especially susceptible to side effects.

Psychiatric disorder may alter the course of HIV infection by impairing immune function or influencing behavior (e.g., accessing and adhering to treatment, seeking out drugs or alcohol). For example, our laboratory has shown that psychiatric disorder can negatively impact adherence to antiretroviral treatment regimens [45,46], a finding that has been seen among other groups studying adherence [47]. In addition, bereavement has been associated with decrements in natural killer cell cytotoxicity, CD4 cell count, and lymphocyte proliferative response to phytohemagglutinin [48–50]. Evidence exists that interventions directed at bereavement reverse the associated immunological deficits [51] and have a salutary impact on plasma viral load as well [52]. Although the pharmacological and psychotherapeutic treatment of depressive disorders can be more complex in patients living with HIV/AIDS, the majority of treatment studies have reported efficacy rates for both types of treatment similar to those found among noninfected persons [44]. A recent study examining the psychiatric effects of protease inhibitors among HIV-infected patients found that in addition to conferring impressive improvement in immune parameters, protease inhibitor use was associated with a significant improvement in mental health as well [53]. In contrast, the non-nucleoside reverse transcriptase inhibitor, efavirenz, has been associated neuropsychiatric toxicity in 53% of patients, and specifically with depressed mood in a subset. Although this toxicity appears to be mild, predominantly occurring at treatment onset, and self-limiting, an AIDS Clinical Trials Group Study (ACTG 5097) is currently being undertaken to better characterize the depressed mood and other neuropsychiatric toxicities of this agent.

2.8. Neurocognition

The deleterious effects of HIV infection on neuropsychological function have been well established (for reviews, see [54,55]). HIV-associated neurocognitive dysfunction can range from subtle deficits in information-processing speed and efficiency to HIV-1-associated minor cognitive–motor disorder (MCMD) to a pronounced dementia syndrome—HIV-1-associated dementia (HAD) [56] (also referred to as “AIDS dementia complex” and as “HIV-1 encephalopathy”). The prevalence and severity of HIV-1-associated cognitive–motor impairment increases as a function of disease progression. HAD has been recently reported to show a reduced cumulative prevalence of 7–10% [57], from prior figures of 17–25% [58] over

the course of AIDS, though the incidence may yet increase. MCMD prevalence has been less well studied but may occur in as many as 25–30% of individuals with early symptomatic HIV-1 infection and in 40% or more of those with AIDS. Subclinical impairment (in which there are deficits in cognitive test performance but no functional status sequelae) occurs in as many as 22–30% of asymptomatic HIV-1 seropositive individuals ([59], cf. [60]). Somewhat higher percentages with subclinical impairment are seen in early symptomatic and late symptomatic than in asymptomatic subjects [54].

Memory impairment, characterized especially by forgetfulness, motor and psychomotor slowing, attentional disruption, and executive systems dysfunction, have all been repeatedly observed among HIV+ individuals. This pattern of neurocognitive deficits is suggestive of disruption to the structures and circuitry along the prefrontal–subcortical axis, and is consistent with data from brain imaging (e.g., [61–63]) and autopsy studies [64,65], both of which implicate preferential subcortical brain involvement.

To define MCMD, there must be at least two of the following six symptoms present: impaired attention or concentration, mental slowing, impaired memory, slowed movements, incoordination, or personality change/irritability/emotional lability. Neuropsychological testing should be employed to support the foregoing diagnostic criteria. For MCMD, there must also be documentable, minor functional impairment in activities of daily living (although not sufficient for Stage 1/Mild HAD), and no other known etiology for the symptoms [56]. To define HAD, there must be (1) an acquired abnormality in at least two of the following six neuropsychological domains: attention, information processing speed, abstraction, visuospatial skills, memory, and language; (2) dysfunction in daily activities specific to this impairment, equivalent to AAN criteria [56] for at least the mild disease stage. As with MCMD, motor impairment may or may not be present; however, evidence of either motor or behavioral impairment is required. Exclusion criteria for the diagnosis of HAD must also be met: (1) no presence of clouding of consciousness (i.e., delirium), or (2) no evidence of another etiology for the impairment. To rule out the latter, MRI of the head is normally done to prove the diagnosis. The former is necessary prior to having a lumbar puncture (LP), a metabolic work-up to rule out hypoxemia or hepatic or uremic encephalopathy, and an evaluation to rule out toxicity of prescribed medications and psychoactive substances.

3. Psychiatric disease in older adults

Unlike HIV infection, which is associated with higher rates of psychiatric disorder, older age appears to act as a protective factor, and is typically associated with lower rates of psychiatric disease than that seen in younger adults. Data from the Epidemiologic Catchment Area (ECA) study reveal a 1-month prevalence rate of 12.3% for all psychiatric disorder among adults over age 65 versus 15.4% for the general adult population [66]. When one removes severe cognitive impairment (e.g., dementia) from those estimates, the gap between these groups widens to 7.4 versus 14.1%, respectively. Among the elderly, anxiety disorders and affective disorders are most common (see Table 2). Of note, drug and alcohol-related disorders are significantly less common among older adults than younger adults, yet nonetheless do occur [67].

Although the prevalence of psychiatric disorder may actually be lower in community dwelling elders, radically different prevalence rates emerge when one focuses on medically ill subgroups. For example, among medically ill elders, the risk of MDD increases 10-fold relative to that of the general population [68]. Elderly men, although not women, also are almost twice as likely to commit suicide than are younger adults. This is particularly so for elderly white males whose suicide rate of 45/100,000 greatly exceeds that of elderly black males (16.2/100,000) as well as the general population rate (12.8/100,000).

Numerous etiological pathways leading to psychiatric disorder in the elderly have been identified including increased rates of neurologic disease and neurotransmitter abnormalities, medical illness, adverse reaction to medications, prescribed or otherwise, physical disability, social isolation, and bereavement. Because psychiatrically ill elders commonly evidence multiple risk factors, it is often difficult to definitively ascribe their illness to any specific etiological factor.

4. Geriatric alcohol and substance abuse

Prevalence rates of alcohol abuse among the elderly generally average between 5–10%, although studies have suggested that up to 50% of older psychiatric patients may drink to excess. Men are roughly five times more likely to meet diagnostic criteria for alcohol abuse or dependence than are women. Psychoactive substance use disorders are yet more rare among elders. Population studies suggest up to 4% of elders misuse drugs, although this is predominantly misuse of prescription medications. Prevalence rates of illicit drug use among the elderly range from 0–2%. However, these are likely underestimates of actual use because medical providers often fail to query elderly patients about their substance use habits. Studies have shown that geropsychiatry patients demonstrate elevated rates of substance use disorders. For example, dually diagnosed patients, those individuals who suffer from both alcohol or substance use disorders as well as psychiatric illness, appear to be at particular risk for the development of multiple untoward consequences. The National Survey of Veterans found that veterans who met diagnostic criteria for both substance abuse and PTSD were 12 times more likely to be HIV infected than those without such diagnoses.

5. Neuropsychiatric and neurocognitive disorder in older HIV+ adults

Given that both HIV infection as well as the normal aging process are associated with an increased risk for neuropsychological compromise, it has been hypothesized that older HIV-infected patients may be at particular risk for cognitive impairment. To investigate the interaction between advancing age and HIV serostatus, Hardy et al. [69] grouped subjects by age (less than 40 years, 40–49, 50 plus) and HIV disease status [HIV–, HIV+ /non-AIDS (CDC stages A1, A2, B1, B2), AIDS] and explored whether these groups differentially demonstrated cognitive decline. As can be seen in Figure 1, age does appear to act as a significant risk factor for the development of HIV-associated neurocognitive impairment. Patients over the age of 50 who had progressed to AIDS had a far higher rate of cognitive impairment than did those patients in the other aforementioned groups. Indeed, 87% of older AIDS patients performed within the impaired range on a series of standard neuropsychological tests compared to control group normative data, a finding that argues that the co-occurrence of both older age and advanced HIV disease is particularly problematic. This has also been supported by Goodkin et al. [70] regarding the occurrence of increased symptoms of MCMD with older age in HIV-1 infection.

Data from the Center for Disease Control and Prevention (CDC) also suggest older age may potentiate the deleterious neurocognitive effects of HIV infection [71]. Depicted in Figure 2 are the percent of patients who met diagnostic criteria for AIDS by virtue of HAD as their AIDS defining illness. These data suggest that two groups are at greatest risk for the development of HIV-associated cognitive-motor impairment—the very young, particularly those under the age of 5, and older HIV+ patients. Whether a similar bimodal age distribution exists for psychiatric disorder has yet to be determined.

Below we represent preliminary data that touches upon this question. Two of us (CHH, SAC) have been examining cognitive and psychiatric predictors of antiretroviral medication adherence among HIV-infected patients. Although not a direct focus of that study, we have amassed data based on a convenience sample of 131 HIV-infected patients, 25% who are over

the age of 50, that provides an estimate of the prevalence of psychiatric disorder as a function of age [72]. As depicted in Figure 3, although younger subjects are significantly more likely to meet diagnostic criteria for current substance abuse or dependence, equal numbers of older and younger patients meet diagnostic criteria for alcohol abuse. Contrary to the existing population-based literature, there was a higher rate of current depressive disorder in the older patients (20%) compared to the younger patients (12%). Although it would be premature to view these data as anything but preliminary and perhaps biased due to their being based on a sample of convenience, one can speculate that the co-occurrence of both older age and HIV infection may increase the risk of developing significant neuropsychiatric disease.

6. Future directions

Given the relative dearth of knowledge regarding the epidemiology of psychiatric disorder in older HIV positive adults, basic epidemiological research as to the incidence and prevalence of HIV-associated psychiatric disorder in the elderly appears to be a necessary first step. Whether such data can be gleaned from existing databases or will require a prospective study such as the Veterans and Aging Cohort Study (VACS) is unclear. After establishing a basic epidemiological understanding of this phenomena, research will be needed to determine whether the nature, severity, course, or treatment of HIV-associated neuropsychiatric and neurocognitive disease differs among older HIV+ adults compared to younger HIV+ comparison groups as well as older uninfected controls. This research thrust will help answer whether there is simply an additive or a true synergistic effect of both advancing age and HIV infection. Related questions that need be addressed include whether neuropsychiatric/neurocognitive dysfunction among older HIV-infected adults is differentially associated with untoward clinical outcomes such as excessively rapid disease progression, differential response to treatment, or difficulty discharging higher order activities of daily living such as adherence to complex medication regimens. Impressive and hard-won advances in the medical and pharmacological treatment of HIV/AIDS have dramatically increased life expectancy among infected individuals. This has increased the ranks of older HIV+ patients, including those with neuropsychiatric disturbance. As such, additional research attention and financial resources must now be devoted to this new chapter in the HIV/AIDS epidemic.

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Fig. 1.

Cognitive impairment: age by HIV disease status. HIV+/Non-AIDS = CDC. Groups A1, A2, B1, B2. AIDS = CDC Groups A3, B3, C1, C2, C3. Adapted from Hardy et al. (1999) [69]. Data drawn from a convenience sample of 694 HIV-infected and 282 uninfected controls, primarily sampled from infectious disease clinics specializing in the treatment of HIV infection.

Fig. 2.

Percentage of persons reported to the CDC with a diagnosis of AIDS with an HIV encephalopathy as their initial AIDS-defining diagnosis (September 1987 to August 1991). From Janssen et al. (1992) [71]. These epidemiologic data are drawn from cases of HIV encephalopathy among 144,184 persons with AIDS reported to the Centers for Disease Control (CDC) from September 1, 1987 through August 31, 1991.

Fig. 3. Rates of psychopathology among older (≥ 50 years) and younger (< 50 years) HIV+ adults. Adapted from Hinkin and Castellon, 2000 [72]. These data are drawn from a convenience sample of 125 HIV-1 seropositive persons participating in a study of factors influencing medication adherence in HIV/AIDS. Approximately 25% of this sample were female, approximately 25% were over the age of 50, and roughly 80% were members of ethnic minority groups.

Table 1

Prevalence rates of DSM-III-R diagnoses among 113 HIV+ men and 57 HIV– men (adapted from Dew *et al.*, 1997) [3]

Diagnosis	HIV+ Rate (cases/100 persons)	HIV– Rate (cases/100 persons)
Lifetime Prevalence		
Major depression	47.8	36.8
Generalized anxiety	15.0	8.8
Dysthymia	8.9	3.5
ETOH disorder	42.5	28.1
Drug use disorder	55.8	50.9
12-month prevalence		
Major depression	36.5	15.1
Generalized anxiety	2.4	1.9
Adjustment disorders		
Depressed mood	2.4	3.8
Anxious mood	23.4	11.3
Mixed	3.5	0.0
ETOH disorder	11.6	9.4
Drug use disorder	18.6	11.3

ETOH = alcohol. ETOH and Drug Use disorders = either abuse or dependence. This sample was comprised of 113 HIV+ and 57 HIV– seronegative men attending primary care physician's offices (medical clinics, group practices, and infectious disease clinics) in a defined geographical area (Allegheny County, PA). All study participants were male, and the primary HIV exposure category was male–male sexual contact.

One-month prevalence rates of diagnostic interview schedule (DIS)/DSM-III. Disorders in five sites in the United States

Table 2

Disorder	Rate per 100					
	All ages (18+ years)			65 Years and over		
	Men	Women	Both sexes	Men	Women	Both sexes
Any DIS disorder	14.0	16.6	15.4	10.5	13.6	12.3
Severe cognitive impairment	1.4	1.3	1.3	5.1	4.7	4.9
Mood disorders	3.5	6.6	5.1	1.4	3.3	2.5
Major depressive episode	1.6	2.9	2.2	0.4	0.9	0.7
Dysthymia	2.2	4.2	3.3	1.0	2.3	1.8
Anxiety disorders	4.7	9.7	7.3	3.6	6.8	5.5
Phobia	3.8	8.4	6.2	2.9	6.1	4.8
Panic disorder	0.3	0.7	0.5	0.0	0.2	0.1
Obsessive-compulsive disorder	1.1	1.5	1.3	0.7	0.9	0.8
Somatization disorder	0.0	0.2	0.1	0.0	0.2	0.1
Antisocial personality disorder	0.8	0.2	0.5	0.1	0.0	0.0
Schizophreniform disorder	0.1	0.1	0.1	0.0	0.0	0.0
Alcohol abuse or dependence	5.0	0.9	2.8	1.8	0.3	0.9
Drug abuse or dependence	1.8	0.7	1.3	0.0	0.0	0.0

From Regier D, et al. (1993). One-month prevalence of mental disorders in the United States and sociodemographic characteristics: The Epidemiologic Catchment Area Study. Acta Psychiatr Scand, 88, 35-47. [66] These data are based on a population sample of 18,571 male and female American adults, aged 18 years and older, interviewed using the National Institute of Mental Health Diagnostic Interview, in five major American cities.