Suicidal behaviour in people with HIV/AIDS: a review

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Objective: To review the existing literature on suicidal behaviour in people with HIV/AIDS infection.
Method: A search on the *Index Medicus/MEDLINE* database was performed, for articles that investigated and/or reviewed suicidal behaviour in people with HIV at any stage of the illness. Only articles written in English were used in this review.
Results: Most studies have been done on homosexual/bisexual groups, with little data available for heterosexual populations or women. Studies show an increased rate of suicidal ideation, suicide attempts and completed suicide in individuals with HIV/AIDS. Of note, there is a high prevalence of psychiatric illness and substance abuse in those with suicidal behaviour.
Conclusions: The increased rate of suicidal behaviour in HIV-infected persons is consistent with findings in other medically ill groups with chronic, life-threatening disorders. However, assessment of any possible direct effect of HIV/AIDS on suicidal behaviour is confounded by methodological limitations of many of the studies. More longitudinal studies encompassing other affected groups including heterosexual populations and women are needed to elucidate the relationship between suicidal behaviour and HIV/AIDS.
Key words: AIDS, HIV, prevalence, risk, suicide.

Australian and New Zealand Journal of Psychiatry 2001; 35:747–757

The phenomenon of suicide has sustained interest in the general and scientific community over many decades. In most developed countries, suicide is ranked among the top 10 causes of mortality [1]. The topic provokes a myriad of emotional, legal and ethical implications making it a controversial issue in many societies.

Suicide: an overview

Despite extensive research into suicide, interpretation of results and comparison across studies remain problematic. This is due in part to the variability between and within countries in the diagnostic and certification processes, which determine what constitutes a 'suicide' [1].

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Received 30 January 2001; revised 18 April 2001; accepted 6 June 2001.

In most developed countries, causes of death, particularly sudden and unexpected deaths are ruled on by the coroner or similar authorities. The official figures on suicide thus reflect the laws which govern this process. Because of the controversial legal and moral implications of suicide, most laws are strict about the process of delivering a verdict of suicide and require unequivocal evidence before a ruling can be made [1]. In Australia for instance, only two out of the seven states routinely use suicide verdicts while in the remainder of the states, official pronouncements of suicide is discouraged [2].

Terminology

For the purposes of this review, the definition of suicide or completed suicide will be taken to mean the voluntary and intentional taking of one's own life [3]. Euthanasia or assisted suicide is beyond the scope of this review. Other forms of suicidal behaviour that will be discussed here include attempted suicide, deliberate self-harm (DSH) and suicidal ideation. Attempted suicide refers to deliberate, self-injurious behaviour (usually involving non-lethal methods) with non-fatal outcome, but for which there was an intent on the part of the person to kill himself or herself [4]. It is important to differentiate attempted or failed suicide from deliberate self-harm (DSH) through either overdose or self-injury where for the majority of cases, there is either no intent to die, or intent is low or ambivalent [5]. Suicidal ideation refers to all thoughts that may be interpreted through behaviour to endanger or threaten one's own life [3].

Suicidal behaviour in people with HIV/AIDS

In the early eighties, AIDS was regarded not only as a terminal illness but one which produced an enormous emotional and psychological burden on the patient and family, compounded by the extra burden of the social stigmatization of the disease.

Results of studies which have investigated suicide and related behaviours in HIV-seropositive individuals, must be interpreted cautiously. In addition to the problems related to the reporting of suicide statistics in general, is the additional problem of knowledge of a suicide victim's HIV status. In some countries, the HIV status of all 'unnatural deaths' is determined, but this is not a universal practice.

Research into suicidal behaviour in HIV-seropositive persons includes studies determining the frequency and 'causes' of suicidal ideation, suicide attempts and completed suicide. A variety of perspectives have been employed to investigate the association of suicide and HIV. Prevalence studies of completed suicide have primarily involved register-based surveys and psychological autopsy examinations. Evaluation of suicidal ideation and suicide attempts in live samples include retrospective assessments based on psychiatric case notes and/or in conjunction with semi-structured interviews or self-reports via questionnaires. Some studies have collected their data based solely on self-reports and structured questionnaires.

Suicidal ideation in people with HIV/AIDS

Studies investigating the prevalence of suicidal ideation in people with HIV/AIDS are presented in Table 1.

There is no consensus about the association between suicidal ideation and being HIV seropositive. Some studies have suggested that suicidal ideation is directly linked to HIV serostatus [6]. Others have found that suicidal thoughts have been context specific and the pathway to suicidal intent is psychologically rather than biologically driven [7]. Psychological variables such as current stressors [e.g. having a partner with AIDS or AIDS-related complex (ARC), unemployment or bereavement], poor adaptive functioning, hopelessness, higher neuroticism and lower social support have been identified as predictors of higher levels of suicidal ideation in HIV-seropositive individuals compared with HIV-seronegative controls [8,9]. Comparisons between studies presented in Table 1 suggest there is mixed evidence that acquiring HIV/AIDS per se increases the risk of suicidal ideation. Some studies have reported little to no differences in suicidal behaviour between HIV seropositive and seronegative groups [7,10–12]

Others have reported a higher rate of suicidal ideation in persons with HIV/AIDS compared with those of unknown serostatus or who were HIV seronegative [6,8,16,19,22]. It is also unclear what influence the progression of HIV illness has on the risk of suicidal ideation. Some authors reported no differences between groups at any stage of the illness [10,13,23]. Others found that asymptomatic HIV seropositive patients showed more suicidal behaviour than those with advanced illness [15,17,18,20] while conversely, advanced illness was reported to be associated with greater suicidal behaviour [21,24]. The period immediately after HIV diagnosis has been made has been identified as a high-risk period for suicidal behaviour [25,26]. However, one study, which assessed participants pre- and post-HIV testing, found no significant differences in suicidal ideation between the group that tested seropositive and those whose result was negative [12]. Another group similarly reported that a positive HIV result did not account for an increased risk of suicide in a sample of injecting drug users [27].

Methodological problems associated with study designs, sampling strategies, and definition of outcome measures are some issues of concern. Most studies are

Table 1. Studies investigating suicidal ideation prevalence in HIV-seropositive individuals

Study	Population	Risk group	Study group	Control group	Assessment method	Results
O'Dowd *et al.* 1989 [10]	Attendees at psychiatric outpatients' clinic for patients with HIV/AIDS, New York, USA	4	14 HIV asymptomatic; 9 ARC; 23 AIDS	23 HIV seronegative/ unknown serostatus matched for age and ethnicity	Psychiatric consultation; past suicidal behaviour also assessed	No differences between any of the groups. Suicidal behaviour in HIV seropositive groups preceded the diagnosis of HIV/AIDS in most patients
Chuang *et al.* 1989 [13]	HIV-seropositive males attending HIV outpatient treatment clinic, Calgary, Canada	1	Asymptomatic; ARC; AIDS	None	Single question on frequency of suicidal ideation during preceding week	No differences between three groups
O'Dowd and McKegney 1990 [11]	All patients referred to C–L psychiatric services inpatients, New York, USA	4	67 AIDS	121 HIV seronegative	Psychiatric consultation	AIDS, 11%; HIV seronegative, 12%
Perry *et al.* 1990 [12]	Community sample of 301 individuals 'at risk' for HIV, New York, USA	1, 2	49 tested HIV seropositive	252 tested HIV seronegative	BDI administered 2 weeks pre-HIV test, and 1 week and 2 weeks post-HIV test	No differences between seronegative and seropositive groups at any of the three assessment phases
Joseph *et al.* 1990 [14]	Males, MACS, Chicago, USA	1	HIV seropositive	HIV seronegative	One item on Hopkins Symptom Checklist	No difference between two groups on level of depressive symptoms or mental health functioning
Schneider *et al.* 1991 [7]	Males, MACS, LA, USA	1	100 HIV seropositive	100 HIV seronegative	Scale for Suicide Ideators (SSI)	No significant difference between HIV seropositive (mean = 26.3) and HIV seronegative (mean = 27.3) suicide intent scores
McKegney and O'Dowd 1992 [15]	All patients referred to C–L psychiatric services inpatients, New York, USA	4	82 HIV asymptomatic; 322 AIDS	1086 HIV seronegative/ unknown serostatus	Psychiatric consultation	Asymptomatic > AIDS = HIV seronegative
Rabkin *et al.* 1993 [16]	53 clients of 'Gay Men's Health Crisis' Center, New York, USA	1	AIDS	HIV seronegative matched for sex, ethnicity and education	Longitudinal assessment over 3 years	AIDS, 73%; HIV seronegative, 17%
O'Dowd *et al.* 1993 [17]	HIV-seropositive individuals attending outpatients clinic in general hospital, New York, USA	4	83 CDC II (asymptomatic); 52 ARC (CDC III-IV); 48 AIDS (CDC IVB-IVD)	None	Psychiatric consultation	CDC II = ARC > AIDS
Twiname 1993 [18]	HIV-seropositive individuals attending a care centre, Houston, USA	1	Asymptomatic; ARC; AIDS	None	Hopelessness Scale, BDI	Asymptomatic > ARC and AIDS
Alfonso *et al.* 1994 [19]	Inpatients in general hospital referred for C–L psychiatry services, New York, USA	1,2,3	382 HIV/AIDS	206 unknown HIV serostatus	Psychiatric consultations	HIV/AIDS > unknown HIV/AIDS serostatus

Table 1. Continued

Study	Population	Risk group	Study group	Control group	Assessment method	Results
Sherr 1995 [20]	HIV-seropositive individuals attending HIV-related problems, psychology clinic for London, UK	4	188 AIDS and HIV symptomatic	None	Retrospective examination of case notes	HIV symptomatic > AIDS
Carvajal *et al.* 1995 [21]	All HIV seropositive patients referred to C/L psychiatry service, Bilbao, Spain	1,2,3	422 AIDS/CDC II	None	Psychiatric consultation	1% (n = 5) referred for suicidal ideation; AIDS > CDC II
Wood *et al.* 1997 [22]	Psychiatric inpatients, Atlanta, USA	4	50 HIV seropositive	50 HIV seronegative, demographically matched	Examination of clinical case notes	60% HIV seropositive; 42% HIV seronegative
Chandra *et al.* 1998 [23]	HIV-seropositive males and females attending outpatient treatment clinic, Bangalore, India	3	Individuals at different stages of disease progression	None	Clinical interview	No differences between any of the groups at different stages of HIV disease
Cochand and Bovet 1998 [6]	Sample of 164 males recruited from community and HIV outpatient clinic, Switzerland	1	65 HIV seropositive	84 HIV seronegative	Poldinger's Scale	HIV seropositive > HIV seronegative (age adjusted)
Kelly *et al.* 1998 [8]	229 males recruited from HIV outpatient clinics, support services and volunteer organizations, Melbourne, Australia	1	164 HIV seropositive	65 HIV seronegative	Composite score derived from BDI and GHQ	HIV seropositive score > HIV seronegative
Kalichman *et al.* 2000 [24]	Community sample recruited from AIDS service organizations	4	113 symptomatic and asymptomatic HIV seropositive individuals aged 45 years and over	None	Suicide intention item from BDI	Symptomatic > asymptomatic

ARC, AIDS-related complex; BDI, Beck Depression Inventory; C–L, consultation–liaison; CDC, Centers for Disease Control (numerals refer to CDC classification of HIV disease stage, the higher the number, the more advanced the illness); GHQ, General Health Questionnaire; MACS, Multicentre AIDS Cohort Study. Risk Group Codes: 1, homosexual/bisexual; 2, intravenous drug users; 3, heterosexual; 4, not specified.

retrospective in nature and therefore data is not necessarily corroborated. Variability across studies in the types of scales or questionnaires used makes it difficult to compare results. For instance suicidal ideation was assessed using single items on questionnaires by some researchers [13,14,24]. Others used case notes from psychiatric consultations which involve subjective judgement on the part of assessors [10,11,15,17,19–23]. Suicidal ideation and suicide attempts are not often separately assessed but investigated jointly as suicidal behaviour. Participants in most of these studies are often convenience groups comprising psychiatric inpatient groups and homosexual males who have been reported to experience high lifetime rates of alcohol and substance abuse [28–31] and depressive symptoms [32] regardless of HIV serostatus [33]. Of interest here, however, is the finding that suicidality remains significantly associated with homosexuality even when controlling for substance abuse and depressive symptoms [34]. It should be noted here that the association between homosexuality and higher suicidal behaviour has been mainly reported in studies conducted in developed countries and may not necessarily generate to other societies. However, dearth of data from developing societies (particularly some Asian and African countries where HIV infection is common) does not allow for unequivocal conclusions to be made on the association between same-gender sexual orientation and increased suicidality. Another common problem with many of the studies is the lack of appropriate control groups. Many studies did not include control groups, or included individuals of unknown serostatus in their control samples [10,15,19].

Suicidal ideation in HIV seropositive females

The literature on suicidal behaviour in HIV seropositive females is not as extensive as that on males. Brown and Rundell [35] compared males and females in their study assessing psychiatric morbidity in HIV-seropositive US Air Force personnel. Only 6.7% (n = 1) of the 15 female personnel who participated in the study admitted to mild suicidal ideation but did not make any plans, attempts or gestures. By contrast, 21% of the male participants reported suicidal thoughts, attempts or plans since learning of their seropositivity. The mean period of time that the male and female groups had first learnt of their seropositivity was approximately equal at 13.0 and 12.8 months, respectively. There were two known cases of completed suicide among the HIV-seropositive male personnel but none among the females. The extent of the difference in suicidal ideation between both sexes surprised the authors as previous research indicates that females are three times more likely to attempt suicide than males. They suggested that several characteristics of the female sample may have been buffers against the morbidity of HIV. Only one of the 15 had AIDS, the rest were asymptomatic. All were physically healthy and none had a known history of intravenous drug use (IVDU) or alcohol abuse. There were as many black people (47%) as white people (53%) and the average age of the sample was 26.5 years. Prospectively, suicidal behaviour of HIV-seropositive females does not appear to increase although there is greater likelihood of having a psychiatric diagnosis at follow up [36]. Suicidal behaviour in HIV-seropositive females appears to be more influenced by a history of drug abuse than being HIV seropositive [37]. Suicidal concerns appear to be less significant for minority women than non-minority, and suicidal behaviour in HIV-seropositive females has been found to be significantly associated with finance, housing, employment, isolation and lack of social support and relationship issues rather than concern about being HIV seropositive [38].

Suicide attempts and deliberate self-harm in persons with HIV/AIDS

Many of the studies examining the characteristics of suicide attempts and DSH in HIV-seropositive individuals have found that the presence or absence of psychiatric morbidity, substance abuse and previous suicide attempts were more predictive of the acts occurring than being HIV seropositive per se [26,37,39]. However, it is important to note that investigating suicide attempts among HIV-seropositive individuals with drug using habits is difficult because of the need to distinguish between accidental versus deliberate overdose.

James and colleagues [37] found that in a group of 55 pregnant HIV-seropositive females, significantly more suicide attempts were made by those with a history of drug abuse (21.1%) than those without (2.8%). Simoni and colleagues [40], however, did not find similar results. They surveyed 230 women with HIV/AIDS and found that while the suicide attempt rate was high in the group (26% pre-HIV and 19% post-HIV), a history of lifetime or current substance abuse was not significantly associated with the attempts. Sixty-six percent reported a history of heavy drug use. Instead, depression, greater number of disease symptoms, loneliness, need for support and being younger were more predictive of suicide attempts post-HIV diagnosis. More than 50% of those who attempted suicide after becoming HIV seropositive had a history of attempts prior to HIV diagnosis. The authors suggested that the risk of suicide was compounded for this group of women derived from a poor inner-city sample.

Table 2. Register studies on rate of suicide in HIV seropositive and AIDS-diagnosed persons versus general community

Study	Unadjusted relative risk	Age-adjusted relative risk
Marzuk *et al.* 1988 [47]	66.2	36.3
Kizer *et al.* 1988 [48]	17.0	20–59 years, 16.1 20–39 years, 21.4
Plott *et al.* 1989 [49]	16.3	ND
Cote *et al.* 1992 [50]	20.4	7.4
Mancoske *et al.* 1995 [51]	134.6	ND
Marzuk *et al.* 1997 [52]	ND	2.0

ND, no data.

Gala and colleagues [39] reported that HIV-seropositive individuals with a past history of psychiatric illness were 7.7 times at greater risk of DSH than those without a psychiatric history. Past DSH also increased the risk fivefold of future acts of DSH. Rundell *et al*. [26] compared the psychiatric data of 15 HIV-seropositive suicide attempters with 15 seropositive non-attempters matched for age, sex and race. All were Air Force personnel. Examination of the psychiatric data revealed a significantly higher prevalence of alcohol abuse and psychiatric morbidity among the attempters compared to the non-attempters. There were also significant correlations between the suicide attempts and stressful life events such as separation from significant others and change of jobs because of HIV serostatus. However, the study found that the attempted suicide rate among the HIV-seropositive personnel was 16–24 times higher than the rate for the entire US Air Force. It is possible that HIV-seropositive individuals who attempt suicide may already be vulnerable prior to becoming infected and that contracting the HIV illness confers an added burden [20,21].

Completed suicide in people with HIV/AIDS

Studies of completed suicide include case reports, register studies and psychological autopsy studies.

Case reports

Copeland [41] investigated 25 AIDS-related cases of suicide from 1985 to 1989 in a Florida county. Diagnosis of AIDS or fear of AIDS played a role in all the suicides. All of the suicide victims were male, 88% were white. The mean age was 38 years with the ages ranging from 29 to 59 years. More than 90% of the victims were homosexual. Post-mortem results indicated the presence of illicit drugs in four of the victims. There was a wide range of methods of suicide including overdosing, shooting, hanging, jumping, carbon monoxide poisoning and cutting of wrists. Death by shooting was the most common method chosen. On review, it was found that 64% had been depressed at the time of their death. A history of previous suicide attempts was noted in four cases.

A similar profile of six AIDS-related suicides in London was reported by Pugh and colleagues [42]. All were male and five were homosexual. A history of psychiatric illness, predominantly depression, was noted in four cases. Of the two without a psychiatric history, it was believed that the main motive for the suicides was ‘to be released from a debilitating condition’ as five of the cases had advanced symptomatic HIV disease (as defined in the Centers for Disease control HIV Classification, Stage IV (CDC-IV)) at the time of death. Two had made previous suicide attempts, which predated the diagnosis of HIV.

Suicidality can also be exacerbated by HIV dementia, which is associated with labile mood, behavioural disinhibition, impaired judgement and impulsivity. Alfonso and Cohen [43] reported two cases of HIV-seropositive individuals in their 30s who exhibited suicidal behaviour. Psychiatric evaluation revealed symptoms consistent with dementia including disorientation, concrete thinking, global memory dysfunction, affective lability and suicidal ideation. Computed tomographic (CT) head scans of both individuals indicated cortical atrophy. Both individuals had a history of substance use, which may also have increased the risk of suicidal behaviour. The authors noted the need for studies to further investigate the association between HIV dementia and suicidality.

Kirchner [44] reported a case of suicide in a man who had been diagnosed with HIV/AIDS 18 months previously with no history of psychiatric illness. He suggested that this may have been the result of an early organic psychosis (although a detailed histological examination of his brain was not conducted), and in his discussion

raises the possibility of a variety of neuropsychiatric syndromes due HIV/AIDS which may contribute to suicidal behaviour. Although some of the cases described by Copeland [41] and Pugh and colleagues [42] had AIDS, neither specifically comment on the possible contribution of neuropsychiatric problems such as delirium to the suicides they describe.

Halstead and colleagues [45] noted in one of the five cases they describe of an individual with no known family or personal psychiatric history and with good premorbid personality who committed suicide after being admitted to hospital for erratic behaviour. Upon admission, he had expressed suicidal thoughts. There was no known precipitant to his action. No organic symptoms were noted and no neurological examinations were performed. His HIV seropositivity was established postmortem and it was unknown if he had been aware of his serostatus.

Case studies have the advantage of providing richer insight into the clinical and psychosocial characteristics of cases and produce material that may be of heuristic value [42]. However, they lack the methodological rigour of case controlled studies. This restricts the scope of their generalisability. Nonetheless, the overall profile of HIV-related suicides presented by these case reports is consistent with those produced by case–controlled studies. The victims are almost exclusively white, homosexual males in their 30s and there appears to be a high prevalence of psychiatric morbidity at the time of death.

Register studies

Register-based reports involve matching population figures on causes of death to AIDS register data and are generally regarded as the most reliable and valid method of data collection [46]. Table 2 presents results of register studies investigating the prevalence of HIV/AIDS-related suicides compared with the general population.

As Table 2 indicates, the relative risk (even when age adjusted) of persons with AIDS dying from suicide is higher than that of the general population. However, the above results must be interpreted with caution due to methodological limitations of the studies. For instance, the relative risk reported by Mancoske and colleagues [51], which was much higher than the others, was inflated because the study sample was not strictly limited to those persons whose death certificates mentioned either HIV or AIDS diagnosis. It also included persons whose death certificates documented the presence of opportunistic infections commonly suffered by people with AIDS such as cytomeglovirus (CMV), Karposi's sarcoma and *Pneumocyctis carinii* pneumonia (PCP) but not necessarily a diagnosis of HIV/AIDS.

Although some of the studies adjusted their relative risk rates for sex and age, other relevant factors such as IVDU, sexual orientation and relationship status and race were not always controlled for. Variability between country practices of registering deaths as suicide also adds to the difficulty of establishing the true extent of suicide in the community, as does the problem of separating out those who died from accidental versus deliberate overdose of drugs. Therefore, it is not surprising perhaps that there is great variation between the relative risk (age-corrected) rates of suicide in HIV/AIDS reported by the studies in Table 2 [46]. A compounding problem is that the rate of AIDS-related suicides is actually quite low, accounting for as little as 0–3.3% of total suicides [53]. This observation was borne out in a study, which found that suicides of males with HIV did not have any substantial effect on suicide trends in the USA [54].

It is difficult to determine the effects of possible confounding factors in these studies because most did not provide information on psychiatric histories or psychosocial issues associated with the suicides. The one study [47], which did note that 42% of the AIDS-related suicides had contact with a psychiatrist less than 5 days before their death. Another limitation is that results of existing studies are dominated by the USA experience and may not be generalisable to other cultures, particularly developing nations, because of different management methods, support systems and a difference in profile of individuals infected by HIV. Attempts to conduct similar studies in other countries have been hampered by poor data collection and maintenance of databases on the incidence of AIDS/HIV and suicides. However, despite the limitations imposed by methodological shortfalls on the generalisability of the results of the above studies, cumulatively, they suggest an elevated rate of suicide in men with HIV/AIDS.

Some researchers have undertaken studies in defined cohorts to better understand the incidence of suicide and associated risk factors in persons with HIV and/or AIDS. In one such study that assessed rates of suicide in the US Air Force [55], HIV-seropositive personnel did not appear to be at significantly greater risk of suicide (RR = 2.08, 95% CI = 1.00–3.82) than HIV-seronegative persons (RR = 1.67, 95% CI = 1.07–2.48). When adjusted for age, sex and race, the suicide rates for both groups were only marginally higher than the general population.

Psychological autopsy studies

Another method to determine HIV-related deaths by suicide has been by psychological autopsy, which involves the reconstruction of suicidal death through interviews

Table 3. Psychological autopsy studies investigating the association between HIV and suicide

Study	Suicide as percentage of sudden death among HIV-seropositive individuals
Rajs and Fugelstad, 1992 [57]	25.0
Barbieri *et al.* 1989 [58]	23.7
Pueschel and Heinemann 1995 [59]	18.3
Thompson *et al.* 1998 [60]	35.0

with survivors. The method was developed at the Suicide Prevention Centre in Los Angeles during the 1950s in an attempt to improve the accuracy of coroner's verdicts. The procedure analyses death through physical, psychological and social perspectives and involves interviews with family members and other key informants to provide detailed information of a kind that cannot be obtained by other methods [56]. With regard to HIV/AIDS studies, in most cases, where possible, HIV serostatus is determined post-mortem if that information is not available at the time of death. Data is also gathered from medical records. Table 3 presents the results of such studies.

Results of the studies (Table 3) indicate that suicide (as determined by the coroner) was the cause of death in approximately 26% of cases of HIV-seropositive persons who died in suspicious or violent circumstances. Of note, all studies do not report rates of suicide in HIV-seropositive individuals. More than half of the HIV-related suicides were considered to have been in homosexual/bisexual individuals [57,59,60]. A history of IVDU was noted in 38% of cases regarded as suicides [60] while in one study [57], psychoactive drugs were detected in 70% of the cases. In the same study, 67% had expressed suicidal intent or showed depressive symptoms before their deaths.

Two important limitations of these studies is that first, autopsies could not be conducted on all cases for reasons ranging from refusal of existing family members, to advanced decomposition of bodies precluding the removal of bodily samples for HIV testing. Therefore, there is still a percentage of cases for whom HIV serostatus was unknown and for whom conclusions cannot be drawn about cause of death and associated factors. Second, these results must be interpreted with caution, bearing in mind that coroner's practices on delivering verdicts of suicide can vary between countries and even between States.

Risk factors associated with suicidal behaviour in HIV/AIDS

Individuals infected with HIV face disease-specific stressors but also are subject to a large number of general suicide risk factors that include high rates of psychiatric morbidity and substance abuse [61]. Psychiatric disorder is associated with a high risk of suicide. The lifetime risks of suicide have been estimated at 6% for affective disorder, 7% for alcohol dependence, 4% for schizophrenia [62].

Psychosocial stressors peculiar to HIV/AIDS include multiple bereavements due to the loss of partner and friends to AIDS, the stigma associated with the illness and accompanying rejection. As with chronic and debilitating illnesses, HIV/AIDS sufferers may also face financial problems due to increased inability to work. Lifetime depressive disorders also appear to be higher amongst individuals with same-gender sexual orientation [32] and lifetime rates of suicide associated with depressive illness have been reported as ranging from 6% [62] to 15% [63]. There appears to be a high prevalence of substance abuse in many of the HIV-seropositive groups studied, which confers an added risk of suicidal behaviour.

Comparison of suicide in HIV/AIDS with other medically ill populations

Earlier investigations into the association between suicide and medical illness reported suicide to be the cause of patients' deaths in 10.9–51.0% of cases [64]. Patients with cancer [65–67] and diseases of the central nervous system (CNS) including multiple sclerosis [68–70] and Huntington's disease [71,72] were at greater risk of committing suicide as were older patients with chronic illness. As AIDS is a terminal disease which affects all organ systems [73] including the CNS, it is not unreasonable to expect that HIV/AIDS may also be associated with a greater risk of suicidal behaviour [6].

In a recent and comprehensive review, Harris and Barraclough [74] conducted a meta-analysis of all studies from 1966 to 1992 investigating the prevalence of suicide in individuals with 63 different medical disorders including HIV/AIDS. Six studies [47,49,50,57,75,76] (out of a possible 18) on HIV/AIDS and completed suicide met criteria for the meta-analysis. All indicated

an increased risk and collectively represented almost a sevenfold increase compared with the expected rate. Other groups of medical disorders that also showed significant increase in risk of suicide included Huntington's disease (threefold risk), multiple sclerosis (twofold increase), malignant neoplasms (ranged from 1.4 to 2.5-fold risk), peptic ulcers (twofold increase), renal disease (14-fold risk), spinal cord injury (fourfold risk) and systemic lupus erythematosus (fourfold risk). A consistent finding from the review was that the mental illness and/or substance abuse were influential factors in those diseases with an increased risk of suicide. Although the risk of suicide in AIDS is not the highest for all the medical conditions, it is greater than that for the 'traditional' diseases. This may reflect the fact that it is a relatively new illness with a variety of physical manifestations and psychological implications, and is generally regarded as ultimately fatal. In addition, less is known about effective treatment and management than is the case for most other medical disorders, at least until recently. It may also be compounded by the social stigmatization of the illness.

There is a consistently reported strong association between mental illness, particularly depression, and suicidal behaviour in physically ill patients [77], although not all researchers have found this association [78]. One possible confounding factor in discrepancies between studies is that depression has been and often remains underdiagnosed and inadequately treated, particularly in primary care settings [79].

Implications of new treatment

When HIV/AIDS was first identified in the early 1980s, it was considered a terminal illness. The introduction of more effective antiretroviral treatments in the last two decades has offered a better prognosis for many HIV-infected individuals. The data in Table 2 tentatively suggests a decrease in age-adjusted relative risk of suicide for persons with HIV/AIDS over the years, coinciding with the introduction of these newer antiretrovirals. The nature of the long-term impact of these more effective antiretrovirals on people's lives is as yet unclear – more time will be required to determine this. However, it is conceivable that one of the effects might be the relaxation of community attitudes towards preventative measures of HIV-infection, manifested by a recent increase in unsafe sexual practices, particularly amongst men who have sex with other men [80]. In Victoria, Australia for instance, there was a 41% increase in new HIV diagnosis in 2000 [80]. Recent studies have noted an association between highly active antiretroviral therapy and decrease in depressive symptoms in HIV-seropositive individuals [81,82]. Given the association between depressive illness and higher risk of suicidal behaviour, it is not unlikely that these newer antiretrovirals might have an impact on suicidal behaviour. However, the psychological impact of newer and better treatments may be complex. Those who experience major improvements in physical health may also be presented with paradoxical dilemmas such as what to do with their 'new lease on life', particularly if they had previously re-organized their life affairs in preparation for death [83]. On the other hand, those who do not respond to the new treatment may experience devastating disappointment.

Conclusion

Early epidemiological studies indicated an elevated risk of suicide in persons with HIV/AIDS compared with the general population. However, results from studies which have investigated suicidal behaviour in defined groups of subjects with HIV/AIDS suggest that although there is an association, it is mediated by a variety of other factors. A high prevalence of well-established suicide risk factors including psychiatric morbidity (particularly depression and substance abuse [62]), same-gender sexual orientation [34,84,85], male gender and stressors amongst HIV-seropositive individuals are major confounds. Future research, including longitudinal, needs to address these issues to determine if HIV/AIDS confers an added risk of increased suicidality above and beyond the contributions of other high-risk factors. There is little data from developing countries yet HIV has become increasingly prevalent in Asia and Africa. Studies fail to include HIV-seropositive persons of non-English speaking background perhaps because of resource constraints including lack of culturally sensitive research tools. Yet, a recent increase in HIV has been observed in individuals who originate from countries with high rates, specifically Thailand, Cambodia and Myanmar [80]. More research needs to focus on these people.

Acknowledgement

Funding for the project was provided by the Mental Health Branch, Victoria

References

1. Kreitman N. Suicide and parasuicide. In: Kendall RE, Zealley AK, eds. *Companion to psychiatric studies*, 5th edn. London: Longman, 1993:743–760.
2. Cantor CH, De Neulinger K, Leo D. Australian suicide trends 1964–1997: youth and beyond? *Medical Journal of Australia* 1999; 171:137–141.

3. Valente SM, Saunders JM. Suicide and HIV disease. In: van Gorp WG, Buckingham SL, eds. *Practitioner's guide to the neuropsychiatry of HIV/AIDS*. New York: Guilford, 1998:263–293.
4. Moscicki E. Identification of suicide risk factors using epidemiologic studies. *Psychiatric Clinics of North America* 1997; 20:499–517.
5. Catalan J, Pugh K. Suicidal behaviour and HIV infection – is there a link? *AIDS Care* 1995; 7 (Suppl. 2):S117–S121.
6. Cochand P, Bovet P. HIV infection and suicide risk: an epidemiological inquiry among male homosexuals in Switzerland. *Social Psychiatry and Psychiatric Epidemiology* 1998; 33:230–234.
7. Schneider S, Taylor S, Hammen C, Kemeny M, Dudley J. Factors influencing suicide intent in gay and bisexual suicide ideators: differing models for men with and without human immunodeficiency virus. *Journal of Personality and Social Psychology* 1991; 61:776–788.
8. Kelly B, Raphael B, Judd F, Perdices M, Kernutt G, Burnett P *et al.* Suicidal ideation, suicide attempts, and HIV infection. *Psychosomatics* 1998; 39:405–415.
9. Schneider S, Taylor S, Kemeny M, Hammen C. AIDS-related factors predictive of suicidal ideation of low and high intent among gay and bisexual men. *Suicide and Life-Threatening Behavior* 1991; 21:313–327.
10. O'Dowd M, McKegney F, Natali C, Harkavy J, Asnis G. A comparison of suicidal behaviours in patients in an AIDS related psychiatric clinic and in a general psychiatry clinic. 5th International Conference on AIDS, Montreal, Canada, 1989.
11. O'Dowd M, McKegney F. AIDS patients compared with others seen in psychiatric consultation. *General Hospital Psychiatry* 1990; 12:50–55.
12. Perry S, Jacobsberg L, Fishman B. Suicidal ideation and HIV testing. *Journal of the American Medical Association* 1990; 263:679–682.
13. Chuang H, Devins G, Hunsley J, Gill M. Psychosocial distress and well-being among gay and bisexual men with human immunodeficiency virus infection. *American Journal of Psychiatry* 1989; 146:876–880.
14. Joseph J, Caumartin S, Margalit T, Kirscht J, Kessler R, Ostrow D, Wortman C. Psychological functioning in a cohort of gay men at risk for AIDS: a three-year descriptive study. *The Journal of Nervous and Mental Disease* 1990; 178:607–615.
15. McKegney F, O'Dowd M. Suicidality and HIV status. *American Journal of Psychiatry* 1992; 149:396–398.
16. Rabkin J, Remien R, Katoff L, Williams J. Suicidality in AIDS long-term survivors: what is the evidence? *AIDS Care* 1993; 5:401–411.
17. O'Dowd M, Biderman D, McKegney F. Incidence of suicidality in AIDS and HIV-positive patients attending a psychiatry outpatient program. *Psychosomatics* 1993; 34:33–40.
18. Twiname G. The relationship between HIV classification and depression and suicidal intent. *Journal of the Association of Nurses in AIDS Care* 1993; 4:28–35.
19. Alfonso C, Cohen M-A, Aladjem A, Morrison F, Powell D, Winters R, Orlowski B. HIV seropositivity as a major risk factor for suicide in the general hospital. *Psychosomatics* 1994; 35:368–373.
20. Sherr L. Suicide and AIDS: lessons from a case note audit in London. *AIDS Care* 1995; 7 (Suppl. 2):S109–S116.
21. Carvajal M, Vicioso C, Santamaria J, Bosco A. AIDS and suicide issues in Spain. *AIDS Care* 1995; 7 (Suppl. 2):S135–S138.
22. Wood KA, Nairn R, Kraft H, Siegel A. Suicidality among HIV-positive psychiatric patients. *AIDS Care* 1997; 9:385–389.
23. Chandra P, Ravi V, Desai A, Subbakrishna D. Anxiety and depression among HIV-infected heterosexuals – a report from India. *Journal of Psychosomatic Research* 1998; 45:401–409.
24. Kalichman SC, Heckman T, Kochman A, Sikkema K, Bergholte J. Depression and thoughts of suicide among middle-aged and older persons living with HIV-AIDS. *Psychiatric Services* 2000; 51:903–907.
25. Capaldini L. HIV disease, psychosocial issues and psychiatric complications. In: Sande MA, Volberding PA, eds. *The medical management of AIDS*, 6th edn. Philadelphia: Saunders, 1999:241–263.
26. Rundell J, Kyle K, Brown G, Thomason J. Risk factors for suicide attempts in an human immunodeficiency virus screening program. *Psychosomatics* 1992; 33:24–27.
27. van Haastrecht HJ, Mientjes GH, van den Hoek A, Coutinho RA. Death from suicide and overdose among drug injectors after disclosure of first HIV test result. *AIDS* 1994; 8:1721–1725.
28. Bell A, Weinberg MS. *Homosexualities: a study of diversity among men and women*. New York: Simon and Schuster, 1978.
29. Cabaj RP. Substance abuse in gay men, lesbians, and bisexuals. In: Cabaj RP, Stein TS, eds. *Textbook of homosexuality and mental health.* Washington: American Psychiatric Press, 1996:783–799.
30. McKirnan DJ, Peterson PL. Stress, expectancies, and vulnerability to substance abuse: a test of a model among homosexual men. *Journal of Abnormal Psychology* 1988; 97:461–466.
31. Stall R, Wiley JA. A comparison of drug and alcohol use of homosexual and heterosexual men. *Drug and Alcohol Dependence* 1988; 22:63–74.
32. Cochran S, Mays V. Depressive distress among homosexually active African American men and women. *American Journal of Psychiatry* 1994; 151:524–529.
33. Williams J, Rabkin J, Remien R, Gorman JM, Ehrhardt AA. Multidisciplinary baseline assessment of homosexual men with and without human immunodeficiency virus infection. II: standardized clinical assessment of current and lifetime psychopathology. 1991; 48:124–130.
34. Herrell R, Goldberg J, True WR, Ramakrishnan V, Lyons M, Eisen S, Tsuang MT. Sexual orientation and suicidality: a co-twin control study in adult men [see comments]. *Archives of General Psychiatry* 1999; 56:867–874.
35. Brown G, Rundell J. Suicidal tendencies in women with human immunodeficiency virus infection [letter]. *American Journal of Psychiatry* 1989; 146:556–557.
36. Brown G, Rundell J. A prospective study of psychiatric aspects of early HIV disease in women. *General Hospital Psychiatry* 1993; 15:139–147.
37. James ME, Rubin C, Willis S. Drug abuse and psychiatric findings in HIV-seropositive pregnant patients. *General Hospital Psychiatry* 1991; 13:4–8.
38. Sherr L, Barnes J, Elford J, Olaitan A, Miller R, Johnson M. Women with HIV disease attending a London clinic. *Genitourinary Medicine* 1997; 73:274–279.
39. Gala C, Pergami A, Catalan J, Riccio M, Durbano F, Musicco M *et al.* Risk of deliberate self-harm and factors associated with suicidal behaviour among asymptomatic individuals with human immunodeficiency virus infection. *Acta Psychiatrica Scandinavica* 1992; 86:70–75.
40. Simoni J, Nero D, Weinberg B. Suicide attempts among seropositive women in New York city. *American Journal of Psychiatry* 1998; 155:1626–1627.
41. Copeland A. Suicide among AIDS Patients. *Medicine, Science and the Law* 1993; 33:21–28.
42. Pugh K, O'Donnell I, Catalan J. Suicide and HIV disease. *AIDS Care* 1993; 4:391–339.
43. Alfonso C, Cohen M-A. HIV dementia and suicide. *General Hospital Psychiatry* 1994; 16:45–46.
44. Kirchner J. AIDS and suicide. *The Journal of Family Practice* 1995; 41:493–496.

45. Halstead S, Riccio M, Harlow P, Oretti R, Thompson C. Psychosis associated with HIV infection. *British Journal of Psychiatry* 1987; 153:618–623.
46. Starace F, Sherr L. Suicidal behaviours, euthanasia and AIDS. *AIDS* 1998; 12:339–347.
47. Marzuk P, Tierney H, Tardiff K, Gross E, Morgan E, Hsu M-A, Mann J. Increased risk of suicide in persons with AIDS. *Journal of the American Medical Association* 1988; 259:1333–1337.
48. Kizer K, Green M, Perkins C, Doebbert G, Hughes M. AIDS and suicide in California [letter]. *Journal of the American Medical Association* 1988; 260:1881.
49. Plott R, Benton S, Winslade W. Suicide of AIDS patients in Texas: a preliminary report. *Texas Medicine* 1989; 85:40–43.
50. Cote T, Biggar R, Danneberg A. Risk of suicide among persons with AIDS: a national assessment. *Journal of the American Medical Association* 1992; 268:2066–2068.
51. Mancoske R, Wadsworth C, Dugas D, Hasney J. Suicide risk among people living with AIDS. *Social Work* 1995; 40:783–787.
52. Marzuk P, Tardiff K, Leon A, Hirsch C, Hartwell N, Portera L, Iqbal M. HIV seroprevalence among suicide victims in New York City, 1991–1993. *American Journal of Psychiatry* 1997; 154:1720–1725.
53. Chu S, Buehler J, Lieb L, Beckett G, Conti L, Costa S *et al.* Causes of death among persons reported with AIDS. *American Journal of Public Heath* 1993; 83:1429–1432.
54. Buhler J, Devine J, Berkelman R, Chervaley F. Impact of the human immunodeficiency virus epidemic on mortality trends in young men, United States. *American Journal of Public Health* 1990; 80:1080–1086.
55. Dannenberg A, McNeil J, Brundage J, Brookmeyer R. Suicide and HIV infection: mortality follow-up of 4147 HIV-seropositive military service applicants. *Journal of the American Medical Association* 1996; 276:1743–1746.
56. Beskow J, Runeson B, Asgard U. Psychological autopsies, methods and ethics. *Suicide and Life-Threatening Behavior* 1990; 20:307–323.
57. Rajs J, Fugelstad A. Suicide related to human immunodeficiency virus infection in Stockholm. *Acta Psychiatrica Scandinavica* 1992; 85:234–239.
58. Barbieri D, Buchala C, Guidugli R, Lima L. HIV infection in judicial autopsies. 5th International Conference on AID_5, Montreal, Canada, 1989.
59. Pueschel K, Heinmann A. HIV and suicide in Hamburg. *AIDS Care* 1995; 7 (Suppl. 2):S129–S134.
60. Thompson S, Manjikian A, Ambrose A, Ireland L, Stevenson E. HIV positive tests at the Coronial Services in Victoria 1989–1996: lessons for HIV surveillance. *Australian and New Zealand Journal of Public Health* 1998; 22:532–535.
61. Beckett A, Shenson D. Suicide risk in patients with human immunodeficiency virus infection and acquired immunodeficiency syndrome. *Harvard Review of Psychiatry* 1993; 1:27–35.
62. Inskip H, Harris E, Barraclough B. Lifetime risk of suicide for affective disorder, alcoholism and schizophrenia. *British Journal of Psychiatry* 1998; 172:35–37.
63. Guze S, Robins E. Suicide and primary affective disorders. *British Journal of Psychiatry* 1970; 117:437–438.
64. Whitlock F. Suicide and physical illness. In: Roy A, ed. *Suicide.* Baltimore: Williams and Williams, 1986:151–170.
65. Allebeck P, Bolund C, Ringback G. Increased suicide rate in cancer patients. *Journal of Clinical Epidemiology* 1989; 42:611–616.
66. Fox B, Stanek EJ, Boyd S, Flannery. J. Suicide rates among cancer patients in Connecticut. *Journal of Chronic Disease* 1982; 35:89–100.
67. Marshall J, Burnett W, Brasure J. On precipitating factors: cancer as a cause of suicide. *Suicide and Life Threatening Behaviors* 1983; 13:15–27.
68. Phadke J. Survival pattern and cause of death in patients with multiple sclerosis: results from an epidemiological survey in north east Scotland. *Journal of Neurology, Neurosurgery and Psychiatry* 1987; 50:523–531.
69. Sadovnick A, Eisen K, Ebers G, Paty D. Cause of death in patients attending multiple sclerosis clinics. *Neurology* 1991; 41:1193–1196.
70. Stenager E, Stenager E, Koch-Henriksen N, Bronuum-Hansen H, Hyllested K, Jensen K, Bille-Brahe U. Suicide and multiple sclerosis: an epidemiological investigation. *Journal of Neurology, Neurosurgery and Psychiatry* 1992; 55:542–545.
71. Pflanz S, Besson J, Ebmeier K, Simpson S. The clinical manifestation of mental disorder in Huntington's disease: a retrospective case record study of disease progression. *Acta Psychiatrica Scandinavica* 1983; 83:53–60.
72. Schoenfeld M, Myers R, Cupples L, Berkman B, Sax D, Clark E. Increased rate of suicide among patients with Huntington's disease. *Journal of Neurology, Neurosurgery and Psychiatry* 1984; 47:1283–1287.
73. Lombardi V, Maneiro E, Cacabelos R. Central nervous system damage during HIV infection. *Methods and Findings in Experimental Clinical Pharmacology* 1996; 18:707–722.
74. Harris E, Barraclough B. Suicide as an outcome for medical disorders. *Medicine* 1994; 73:281–296.
75. Levine A, Wernz J, Kaplan L, Rodman N, Cohen P, Metroka C *et al.* Low-dose chemotherapy with central nervous system prophylaxis and zidovudine maintenance in AIDS-related lymphoma. A prospective multi-institutional trial. *Journal of the American Medical Association* 1991; 266:84–88.
76. Yarchoan R, Venzon D, Pluda J, Lietzau J, Wyvill K, Tsiatis A *et al.* CD4 count and the risk for death in patients infected with HIV receiving antiretroviral therapy. *Annals of Internal Medicine* 1991; 115:184–189.
77. Barraclough B, Bunch J, Nelson B, Sainsbury P. A hundred cases of suicide: clinical aspects. *British Journal of Psychiatry* 1974; 125:355–373.
78. Achte K, Vauhkonen M. Cancer and the psyche. *Omega* 1971; 2:46–56.
79. Davidson J, Meltzer-Brody S. The underrecognition and undertreatment of depression: what is the breadth and depth of the problem? *Journal of Clinical Psychiatry* 1999; 60:4–9.
80. Hocking J, Crofts N. HIV surveillance in Victoria in 2000. *Victorian Infectious Diseases Bulletin* 2001; 4:1–3.
81. Judd F, Cockram A, Komiti A, Mijch A, Hoy J, Bell R. Depressive symptoms reduced in individuals with HIV/AIDS treated with highly active antiretroviral therapy: a longitudinal therapy. *Australian and New Zealand Journal of Psychiatry* 2000; 34:1015–1021.
82. Low-Beer S, Chan K, Yip B, Wood E, Montaner JS, O'Shaughnessy MV, Hogg RS. Depressive symptoms decline among persons on HIV protease inhibitors. *Journal of Acquired Immune Deficiency Syndromes* 2000; 23:295–301.
83. Rabkin J. A 'second life' agenda: psychiatric research issues raised by protease inhibitor treatment for people with the Human Immunodeficiency Virus or the Acquired Immunodeficiency Syndrome. *Archives of General Psychiatry* 1997; 54:1049–1053.
84. Bagley C, Tremblay P. Suicidal behaviours in homosexual and bisexual males. *Crisis* 1997; 18:24–34.
85. Remafedi G, French S, Story M, Resnick MD, Blum R. The relationship between suicide risk and sexual orientation: results of a population-based study. *American Journal of Public Health* 1998; 88:57–60.