SOCIAL SUPPORT
CAUSE OR CONSEQUENCE OF POOR HEALTH OUTCOMES IN MEN WITH HIV INFECTION?

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A substantial literature argues that people who have smaller social networks experience increased risk of death and other negative health outcomes. Early sociological research, for instance, found a link between social support and suicide risk (Durkheim, 1951). Since that early observation, researchers have probed the link between social support and health in a variety of ways. The literature, on the relationship between social support and a variety of different causes of death has evolved over a course of 20

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Epidemiology of Social Support and Health Outcomes

Support and health outcomes may be bidirectional. Hypothetical pathways suggest that the causal pathway between social support and health outcomes is unidirectional. Nevertheless, the pathways between social support and health outcomes are complex and bidirectional. The concept of social support has been widely studied, and its role in health outcomes has been extensively investigated. However, the precise mechanisms by which social support influences health outcomes remain unclear.

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church, and who participated in voluntary organizations and community activities were significantly less likely to die within a 10-year period than were men who were disconnected. However, the Tecumseh Study did not show similar relationships for women (House, Robbins, & Metzner, 1982). In contrast to the findings of Berkman and Breslow (1983) and House et al., in the Durham County, North Carolina study (Blazer, 1982), no consistent pattern of increased mortality rates were associated with a progressive decrease in social support. Rather, in this data set, there appeared to be a threshold effect in which only those individuals, either male or female, who were at the extreme end of the continuum in terms of the least amount of social support, had increased mortality rates. In a study of residents of Evans County, Georgia, those with the fewest ties were at increased risk for mortality. The findings reported were significant for older white males only and not for black individuals and white females (Schoenbach, Kaplan, Fredman, & Kleinbaum, 1986).

Several studies have suggested that the combination of high stress and low social support is a particularly strong predictor of negative outcome. For example, 142 women in the Framingham Heart Study had more cardiovascular disease if they worked in clerical roles and had nonsupportive spouses (Haynes & Feinleib, 1980). A study of Swedish workers revealed that risk for cardiovascular disease was excessive among workers who had low social support, perceived their jobs to be stressful, and felt they had little control over their work environment (Welin et al., 1985). In one study of survivors of myocardial infarction, survivors were classified according to social isolation and stress, and then followed prospectively. Those who experienced low stress and were socially connected had one-fourth the rate of mortality in comparison to those who were under high stress and were isolated (Ruberman, Weinblatt, Goldberg, & Chaudhary, 1984). Despite these strong results, some studies have also failed to show a relationship between social support, stress, and health outcomes (Cohen & Syme, 1985). Many studies focus on the impact of social support on only one disease state or outcome variable. Aneshensel, Rutter, and Lachenbruch (1991) argued that the impact of stress and social support on health may be underestimated if the range of outcomes is limited. An alternative is to go beyond mortality to consider disease stage and measures of disability and health-related quality of life.

It is difficult to make comparisons across studies that have different conceptualization of health outcome. Populations varied greatly from study to study, as did definitions of social support. The measures of social support were usually crude. Some studies merely recorded the presence of a spouse or participation in group activities. In addition, the degree of satisfaction associated with these relationships in specific types of support received were often not considered. Nevertheless, these studies generally show a relationship between social relationships and longevity (Berkman, 1995; Davidson & Shumaker, 1987). These findings have intrigued epidemiologists and have supported the notion that friends and family are health assets.

Although the relationship between social support and mortality may seem impressive, these relationships are primarily correlational. There are at least three rival explanations for the association between the presence of social relationships and health. First, there is the assumed explanation that the correlation between social support and disease is causal—high support protects against illness. The second explanation is that individuals who are sick drive away their social support system.
In the 1980s, medical and social science researchers from the fields of psychiatry,
neuropsychiatry, and AIDS discovered HIV disease as an appropriate model for testing the

PSYCHOIMMUNOLOGIC AND HIV INFECTION

section on the impact of the illness on the immune system will be briefly reviewed.

In addition to the medical issues, HIV infection has raised social and ethical concerns. The stigma associated with the disease has contributed to the discrimination and prejudice experienced by those infected with HIV/AIDS. This section will focus on the effects of discrimination and prejudice on the mental health of individuals infected with HIV/AIDS.

The acquired immune deficiency syndrome (AIDS) has directly affected millions of the world's population, and has become a major public health issue. The psychological impact of HIV/AIDS on individuals and communities has been significant. This section will explore how HIV/AIDS has affected the psychological well-being of individuals and what can be done to support them.

HIV DISSEASE

HIV disease will be reviewed briefly in the next section. Starting with the innate immune response, we will then discuss the role of the adaptive immune response. The antibody response is crucial for controlling the virus and preventing its spread. The CD4+ T cell population is particularly important in the control of HIV replication. The CD8+ T cell response also plays a critical role in controlling the virus.

The immune system is composed of many different cell types, each with specific functions. The immune system is highly complex and constantly monitoring the body for potential threats. The immune system is able to recognize and respond to a wide range of pathogens, including viruses, bacteria, and fungi.

In summary, the psychological impact of HIV/AIDS on individuals and communities has been significant. The immune system is crucial in controlling the virus and preventing its spread. It is important to continue to support and improve the health outcomes of those affected by HIV/AIDS.
effects of psychosocial variables on physical illness (Glaser & Kiecolt-Glaser, 1987). Both the immune and neural systems appeared to be central to HIV progression, and the course of HIV illness varied substantially among infected individuals, suggesting that a variety of factors were related to disease progression. The psychoneuroimmunological hypothesis in HIV has been tested empirically, using a variety of markers of HIV disease progression. HIV infection is detected by observing antibodies to the virus in serum, and is characterized by depletion and infection of CD4+ T-cells, which leaves the immune system compromised and prone to contracting opportunistic infections (signaling disease progression).

The basic premise of the psychoneuroimmunological hypothesis is that the immune systems of individuals who experience major stress in their lives are compromised. The way this works in HIV is as follows. When someone contracts the HIV virus, the virus attaches and enters cells in the host's body, usually CD4+ helper/inducer T-cell lymphocytes. The CD4+ lymphocytes are white blood cells that activate the immune system in order to combat foreign invaders, known as foreign antigens, in the body. HIV multiplies in the body when these CD4+ cells replicate in response to contact with an antigen, such as a cold virus. Thus, the life cycle of HIV consists of a series of steps in which the virus uses the host's own cells to reproduce enormous numbers of new viruses. As more and more CD4+ cells become infected, the immune system becomes unable to respond to infectious agents. Individuals die, therefore, from other infections that the body is no longer able to fight off, not from the HIV virus itself. In addition to destroying the CD4+ lymphocytes, HIV infects a number of other cells, including macrophages, skin, lymph nodes, and endothelial cells of the brain. Thus, the picture of the infection is more complicated than can be presented here. A central premise underlying the observed association between life adversity and health status is that stress exerts a suppressive effect on immune functioning. Studies from several laboratories have shown that a variety of stressors affect the immune response in animals as well as humans (Borysenko & Borysenko, 1982; Palmblad, 1981). Because HIV disease is by nature an immunosuppressive disorder, it has been an especially fertile ground for the study of the impact of psychoneuroimmunological factors in health.

**Does the Health of HIV-Positive Individuals Who Experience Greater Stress in Their Lives Decline More Rapidly Compared to Less Stressed Individuals?**

Currently, the best prognostic indicators of increased HIV-disease symptomatology are absolute CD4+ cell number (Fahey et al., 1990; Pederson et al., 1990) and presence of circulating P24 antigen (among advanced HIV disease stages), although elevated β2-microglobulin levels have also been noted to rise with disease progression (Volberding & McCutchan, 1989). Psychoneuroimmunological studies have used a number of outcomes including CD4+ lymphocyte count (Perry, Fishman, Jacobsberg, & Frances, 1992; Rabkin, Remien, Katoff, & Williams, 1993), percent CD4+ lymphocytes (Patterson et al., 1995), CD4+/CD8+ ratio (Antoni et al., 1990; Goodkin et al., 1992), natural killer (NK) cell cytotoxicity (Antoni et al., 1990; Goodkin et al., 1992), absolute NK cell count (Sahs et al., 1994), time from seroconversion to AIDS diagnosis (Goodkin et al., 1992), survival time (Greco & Stazi, 1987), symptoms of HIV illness
Our findings of HIV-positive males using survival analysis (Reiman et al., 1996) our been echoed by numerous researchers. However, the success of this program has not been without controversy. It is critical that these results are understood within the context of the social support and physical health outcomes observed. The research has shown that social support is crucial for HIV-positive individuals, as indicated in previous studies. In summary, there is a strong link between psychological distress and physical health outcomes for HIV-positive individuals.

In conclusion, the findings highlight the necessity of interventions that address both psychological and social support needs. Effective interventions can improve physical health outcomes and reduce psychological distress. Therefore, it is essential to integrate psychological and social support strategies into treatment plans. This approach can lead to better health outcomes and improved quality of life for HIV-positive individuals.
analysis was based on the existing empirical evidence that psychosocial variables may predict the course of HIV-illness disease progression (described by advance in symptoms, decline in CD4+ cell count, and mortality). We found that depressive symptoms predicted shorter longevity after controlling for symptoms and CD4+ cell count. Large social network sizes predicted longevity among those with AIDS-defining symptoms at baseline, but not among other subjects. Therefore, psychosocial variables and affective states may be related to disease outcome only during later stages of HIV disease. Although the results provide support for psychoneuroimmunological effects in HIV, other confounding explanations may still apply. More longitudinal research is needed to assess the impact stressful life adversity, social support, and affective feeling states may have on HIV-disease progression above and beyond that which is determined by the natural course of HIV diseases and demographic or background characteristics that may influence health status, such as age and socioeconomic status.

Although social support is likely to play a similar role with the context of HIV-related disease as it does with other health problems, only a handful of studies have reported beneficial effects of social support, and longitudinal data are even more scarce. In a cross-sectional study, Wolf et al. (1991) found that less perceived available social support was associated with more use of avoidant coping and greater mood disturbance, including higher levels of self-reported depression and anxiety, and lower levels of vigor among HIV-infected men (half medically asymptomatic, half symptomatic with AIDS or AIDS-related conditions). Similarly, Namir, Wolcott, and Fawzy (1989) found social support to be related to physical and mental health within their sample of 50 men with AIDS. Specifically, instrumental or tangible support was the only variable to significantly predict physical health scores, and it was significantly associated with mood disturbance as well.

It is possible that the type of social support most associated with physical illness varies according to disease stage or level of disability. Thus, in Namir et al.’s (1989) sample of men with full AIDS diagnoses, tangible support was most associated with physical health, perhaps reflecting more progressed disease and increased disability. Furthermore, Zich and Temoshok (1987) found that less available social support was associated with more physical symptoms for men with AIDS, but not for men with AIDS-related conditions (ARC) or HIV-positive asymptomatics. However, less available social support was related to higher levels of hopelessness and depression for all HIV-infected men in their sample. Among asymptomatic HIV-infected men, Blaney et al. (1991) found main effects for negative life events and emotional support. Together, these findings suggest that the domains of social support most closely associated with physical symptomatology may depend on disease status or level of physical dysfunction. Although satisfaction with emotional support appears to be a good predictor of mood and possibly physical symptoms, specific characteristics of emotional support, such as availability of a close companion and reciprocity of social support, warrant further study.

**SUMMARY**

In summary, studies consistently show that smaller social support network size is associated with poor health outcomes. Fewer studies show that instrumental social
mostly symptomatic cases with varying levels of immune function, and a smaller
number of asymptomatic cases with variable levels of immune function. The overall
prevalence of HIV infection in the sample was higher among better-educated,
smarter individuals. In the overall sample, the distribution of
HIV infection was determined at baseline using the 1999 revised class-
ification. The overall prevalence of HIV infection (C+) and 
HIV-seropositive individuals (C+) 
were asymptomatic at baseline (symptom
free). Table 13.1. The majority of participants (73%) were asymptomatic at baseline.

Table 13.1.

Table showing data.

METHOD

For the present analyses, the sample comprised 397 HIV-positive heterosexual and
homosexual males who were participants in a longitudinal cohort study at the HIV
Behavioral Research Center (NHVC), University of California, San Diego. The sample
was recruited from the medical community in the greater San Diego area by
adoptive recruitment from military personnel at the local medical centers. The sample
comprised 397 HIV-positive heterosexual and homosexual males who were participants
in a longitudinal cohort study at the HIV Behavioral Research Center (NHVC), University of California, San Diego. The sample
was recruited from the medical community in the greater San Diego area by
adoptive recruitment from military personnel at the local medical centers.
TABLE 13.1. Demographic and Background Characteristics of Sample (n = 397) at Baseline and 1-Year Following

|                          | Baseline       | One year       
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Age</td>
<td>32.7 (7.1)</td>
<td></td>
</tr>
<tr>
<td>Years of education</td>
<td>14.0 (2.1)</td>
<td></td>
</tr>
<tr>
<td>Hollingshead SES (1-5)</td>
<td>5.7</td>
<td></td>
</tr>
<tr>
<td>Years HIV+</td>
<td>2.0 (1.4)</td>
<td></td>
</tr>
<tr>
<td>CD4+ count</td>
<td>473.5 (260.7)</td>
<td>365.4 (278.4)*</td>
</tr>
<tr>
<td>Beta-2 Microglobulin</td>
<td>2.98 (1.44)</td>
<td>3.36 (1.55)*</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>76%</td>
<td></td>
</tr>
<tr>
<td>African-American</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Latino</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>CDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>73%</td>
<td>45%</td>
</tr>
<tr>
<td>B</td>
<td>23%</td>
<td>38%</td>
</tr>
<tr>
<td>C</td>
<td>4%</td>
<td>17%</td>
</tr>
</tbody>
</table>

*p < .05

cluster of cases with an AIDS diagnosis and severely compromised immune function. All participants completed a 2-hour psychosocial battery, including measures of life stress, coping, social support, and depressive symptoms.

**DEPRESSIVE SYMPTOMS**

The clinician-rated Hamilton Rating Scale for Depression (HRSD) is a 21-item clinical instrument for assessing depressive symptoms based on 3- or 5-point Likert-type scale responses. The HRSD has well-documented validity (Endicott et al., 1981), and it has been used extensively in clinical trials of antidepressant drugs. Interrater reliability has been found to be in the range of 0.80 to 0.91 (Hamilton, 1969; 1974).

The Beck Depression Inventory (BDI) was also given to all participants. The BDI is a self-administered questionnaire consisting of 21 items, each having four graded statements pertaining to how the subject has been feeling during the past week (Beck, 1967). The statements within a question are ordered (0 to 3) to show increasing depressive symptomatology. Summary scores are calculated (range, 0 to 63). The items of the BDI are clinically derived and have undergone extensive reliability and validation studies (Beck, 1976). Internal consistency assessments of reliability have been high (> .90) in most evaluations.

**SOCIAL SUPPORT**

Social support was assessed using the Social Support Questionnaire, a 5-item self-report measure developed by Schaefer, Coyne, and Lazarus (1981). Participants identify
RESULTS

Table 1: Percentages of CD4+ cells at baseline, 6 months, and 12 months

<table>
<thead>
<tr>
<th>Baseline</th>
<th>6 Months</th>
<th>12 Months</th>
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Several analyses were conducted to address the causal relationship between social support and immune activation. These analyses included the use of epidemiological and statistical methods to examine the relationship between social support and the development of HIV infection. The results of these analyses suggest that social support may play a significant role in the prevention of HIV infection. These findings support previous research that has shown the importance of social support in the prevention and management of HIV/AIDS.

In order to further investigate the causal pathway, a cross-sectional correlation model was developed. This model considered the temporal sequence of the predictor (social support) and the outcome (immune activation) and the relationships between these variables. The model was estimated using a linear regression approach and showed a significant association between social support and immune activation. These findings provide further support for the role of social support in the prevention of HIV infection.
A variety of analyses were performed in order to evaluate this issue in greater detail. One approach involved breaking the subjects into smaller groups, based on their change in immune status over the 18-month evaluation. Since the study is still in progress, this allowed us to use only 78 subjects for whom data were complete. The four groups were those whose immune status was relatively high and stable (stable/high group, \( n = 14 \)), those whose immune status was relatively low but stable (stable/low group, \( n = 35 \)), those who began the study with relatively low immune status and declined slowly (slow-decline group, \( n = 21 \)), and those who began the study with relatively high immune status and declined rapidly (rapid-decline group, \( n = 8 \)). Figure 13.2 shows changes in CD4+ cells for these four groups. The lines for the two stable groups are relatively flat over the 18 months of follow-up. The rapid-decline groups shows a sharp fall over time, whereas the slow-decline group starts at a lower level and declines to levels reflecting more serious illness.

Figure 13.3 describes changes in social support network size for these four groups. The most important feature of Figure 13.3 is the line for the rapid-decline group. As demonstrated, those who have rapidly declining levels of immune status also show a significant decline in social support network size. As might be predicted, those with stable, higher levels of immune status maintain a relatively stable social support network size. Those with stable, low immune status begin with lower levels of social support, but show some nonsignificant increase over the course of time. The slow-decline group reflects the expected pattern through the first year of evaluation. However, this group does show an unexpected increase in network size (although not statistically significant) at the final follow-up. Overall, this analysis suggests that progression of illness, particularly for those with rapid changes in immune status, is followed by reductions in network size. Those with stable illness tend to have more stable social networks.
cause this represents only the extremal state of the illness. This stage, which may
port Arthur we performed more detailed analyses on 72 subjects, who had less than
200 CD4+ cells at the third visit. The threshold of 200 CD4+ cells was chosen be-
In order to investigate the relationship between advancing illness and social sup-
ports. However, it is not possible to infer direction of causation from these results.
progressed slowly. These data may suggest that depression is related to poorer pro-
whole stability group. Furthermore, those who rapidly decline immune status,
and the study with greater levels of depression than those whose illness
A's evaluations. The finding suggests that depression is related to
the 12-month (p > 0.05) evaluations. The finding suggests that depression is related to
locally significant (as evaluated by analysis of variance) at the 12-month (p > 0.05) and
and the study with greater levels of depression than those whose illness
and the study with greater levels of depression than those whose illness
6 months. However, the differences between these two groups were small.
the highest BDI scores. Those differences were not statistically significant at base-
the rapidly declining group had the lowest BDI scores, and the slowly declining group
unseen. Figure 1A shows the outcome for the HDL. Interestingly, all evaluations for the HDL were nonsignificant.
with no clear consistent pattern. Similarly, all evaluations for the HDL were nonsignificant.
Figure 2. Changes in CD4+ cells for four CD4+ groups: Stable/high, Stable/low, Rapid Decline, Slow

- Rapid Decline
- Slow Decline
- Stable/low
- Stable/high

MONTH
0 6 12 18
CD4+ CELLS
80 100 120 140 160
last for some years, is typically referred to as AIDS. These analyses focused on 31 subjects who made the transition from 200–500 CD4+ cells to the AIDS (less than 200 cells) category between the first and third visits. We refer to these subjects as the Transition group. For comparison, we considered 21 subjects who were in the AIDS category at both the initial and third visit (AIDS group).

Figure 3.5 shows the network size for the men at the initial and third visits. The figure demonstrates that, at the initial visit, the AIDS patients had smaller social networks than their peers, who, at the time, had not reached the diagnosis of AIDS ($t = 2.01, df = 51, p = .05$). At the third visit, when both groups were in the AIDS category, the network sizes were nearly identical ($t = −.11, df = 51, p = .91$). These findings provide more evidence that worsening illness causes network size to decline.

The findings for instrumental support are summarized in Figure 3.6. In contrast to network size, AIDS patients appear to receive more instrumental support than their peers in earlier stages of the illness. At the initial visit, instrumental support scores were significantly higher for AIDS patients ($t = −2.35, df = 51, p = .025$). However, at the follow-up, the instrumental support for those subjects making the transition from
more evidence for the hypothesis that declining immune function causes reduction in depression was provided to support this hypothesis. Additionally, the model provided a first pathway was that low social support caused reduction in immune function. The use of structural equation modeling allowed the strengths of the relationships to be quantified and the relationships between social support and immune function, the cross-sectional correlate.

In summary, we conducted a series of different analyses designed to investigate the relationship between social support and immune function. The cross-sectional correlate.

Summary of Results

The findings showed no difference in emotional support. BDI measures were comparable between those groups at each assessment. Further, the correlation between the depression outcomes of the two groups was not significant (r = 0.3, p = 0.1). The results suggest that differences could not be explained by differences in depression. Table 1.2

HIV-positive to AIDS increased, whereas it remained steady for those who remained in slow decline. Figure 4. Changes in BDI Depression Inventory score for four CD4+ groups: Stable/High, Stable/Low, Rapid Decline, Slow Decline.

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social support network size. There are many problems with the crossed-lagged correlational model. One problem is that network size was not stable over the course of time. The low correlation between network size at baseline and at follow-up may indicate that network is measured with error. This problem could hinder the interpretation of the model.

A series of other analyses tended to support the hypothesis that declining health status causes reductions in social network size. For example, the group of patients with rapidly declining immune status also experienced systematic reductions in network size over the course of four evaluations that were spread over 18 months. Among patients who made the transition to AIDS status during the study, network size declined significantly. Although patients with rapid decline in immune status tended to be depressed throughout the study, the depression remained relatively stable. Thus, changes in depression could not explain changes in network size. Overall, these data appear to support the hypothesis that reductions in immune status and progression of HIV infection cause reductions in social support network size.

FIGURE 5. Network size for the men who had AIDS at the initial and third visit, and for those who made the transition to AIDS between the first and third visit.
TABLE 13.2. Depression Changes for AIDS and Transition to AIDS Subjects

<table>
<thead>
<tr>
<th></th>
<th>Tiennment</th>
<th>AIDS</th>
<th>Transition</th>
<th>AIDS</th>
<th>Tiennment</th>
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<td>d</td>
<td>1</td>
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<td>1</td>
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</tr>
<tr>
<td>One Year</td>
<td>Baseline</td>
<td></td>
<td></td>
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<td>Baseline</td>
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Discussion

A substantial literature argues that people with small social networks are at risk

FIGURE 6. Instrumental support for the men who had AIDS at the initial and third visits and for those who made the transition to AIDS between the first and third visits.
environm.net. For example, AIDS patients may be victimized by family members and
friends. These potential supporters may feel uncomfortable interacting with someone
who has an infectious disease. Disturbance in marital relationships often follow diag-
nosis and treatment of serious conditions such as heart disease. In diseases such as
HIV infection, the illness almost certainly will interfere with intimate relationships
(Semple et al., 1993).

Our findings are limited to HIV-infected men, and we are uncertain how well they
generalize to other chronic disease groups. Nevertheless, we do feel they have some
important implications. HIV-infected individuals represent an interesting population
for the study of social support and health. They share much in common with other
disease groups (e.g., deterioration of health status, reduced quality of life, increased
contact with the healthcare system). However, HIV disease differs in interesting ways
from other chronic disease groups, such as heart disease and cancer. Unlike other
diseases, HIV is primary seen in young people who have not typically begun to come
to terms with their own mortality. In addition, HIV carries a stigma that other diseases
do not, due to its association with homosexuality and drug use. HIV-infected individ-
uals are also likely to be poor and are often members of minority groups. Thus, HIV may
be associated with a unique set of stressors not seen in other chronic disease groups.
For many HIV-infected individuals, certain important aspects of social support may be
less available than in other chronic diseases. This is especially true for the homosexual
men, such as those who participated in this study. Marriage, for instance, one of the
primary sources of structural support, is typically not available for this group (although
significant partnership may be). In addition, many HIV-positive individuals lose many
friends to the epidemic, further reducing their ability to receive social support.

Epidemiological studies usually attempt to control for disease severity. How-
ever, measures of disease severity are often inadequate. When controls for health status
are entered into multivariate equations, it is likely that the analyses will underadjust,
because the measures of health status simply do not reliably capture the construct.
Another issue is that early phases of illness may interfere with social relationships.
As people progress through illness, they may not be interested in walking, dancing,
or leisure activities, and these may be the early symptoms of an undiagnosed con-
dition.

CRITERIA FOR CAUSAL DIRECTION

Epidemiologists consider five criteria for establishing causal relationships. These
are temporality, strength, consistency, gradient, and plausibility. We will address each
of these briefly.

TEMPORALITY

Temporality occurs when the cause precedes the outcome. The crossed-lagged
correlations and the analyses of specific groups suggest that reduced CD4+ cells
occurs prior to reductions in social support network. Thus, the temporality data
appear to support the alternative hypothesis that illness causes low support.
related studies

models

biologically plausible. Indeed, it requires fewer assumptions than the stress-hypothesis to result in accordance by indices and pores. Thus, the alternative hypotheses seem to perform well for estimates. Furthermore, the illness and the associated illness may reflect meaningful activity. Still, with reduced HPA perfoming activity of daily living decline. For example, mean with advanced HPA cortisol levels are closely related (Kaplan, 1990) to illness progression, capabilities for social support, and in reduced disease. In particular, the illness progression were then followed prospectively. The measures of association between social support networks size and illness are also greater, for example, where a consistent relationship between the independent and the outcome. For example, there is a consistent relationship between the casual and the outcome.
satisfaction significantly predicted survival up to 6 years. However, when the data were analyzed in more detail, it was noted that network size was related to disease severity at baseline. It is possible that increased severity of illness may interfere with an individual’s ability to elicit, make use of, or be satisfied with the support that is obtained from others. In turn, this may deepen the sense of social isolation (Grodner et al., 1996).

A related study evaluated predictors of survival following cardiac surgery in the elderly. In this study, older adults who did not participate in community groups or feel comfort from religion were more likely to die within 6 months of surgery than those who were more socially active. The authors adjusted for biological variables and presurgical activity. However, these typically serve as an underadjustment in multivariate analysis. Nonparticipation in social activities may be a sensitive measure of severity of illness. Thus, we would expect that those who fail to participate in community groups may be more severely ill than those who are more active. Furthermore, those with declining health status may also feel less comfortable with religion (Oxman, Freeman, & Manheimer, 1995).

There have been relatively few studies of the progression of HIV illness in relation to social support. A report by Theorell and colleagues (1995) may, at first, appear inconsistent with our findings. These investigators studied a group of hemophiliacs in Sweden who were infected with the HIV virus. The subjects were divided into those with high or low availability of attachment. Subjects with high availability of attachment progressed more slowly than their peers with low availability of attachment. When considering these results, it is worth noting that availability of attachment is more similar to our instrumental social support variable than to network size. Indeed, our data show that instrumental support actually improves with severity of illness. In other words, availability of instrumental support may also be a consequence rather than a cause of HIV progression. Had we measured availability of attachment, we might have expected it to increase with advancing disease. It is also possible that social support functions differently among Swedish hemophiliacs than among American homosexual men.

**SUMMARY**

An extensive literature argues that high levels of social support provide protection against disease progression. An alternative explanation is that decreased social activity is a consequence rather than a cause of illness. Cohort data from HIV-infected men suggest that social network size declines as men become progressively more ill. Furthermore, our data indicate that illness progression precedes rather than antecedes declines in social network. Most published studies are based on cross-sectional observations that are unable to disentangle cause and effect. Our data suggest that social support should not always be conceptualized and investigated as a predictor of health outcome. Indeed, changes in social support may also be a consequence of illness. Furthermore, there may be reciprocal influences. The relationship between social support and outcome may be bidirectional.

We offer these observations to stimulate discussion. The study has many significant limitations. First, this study is based on a relatively small group of HIV-infected
we encounter common explanations of these problems. In conclusion, low data are available to address the relationship between social support and health outcomes. We believe that social support can influence the course of social processes, and that these processes are influenced by social variables. However, we cannot determine the exact extent of these influences, and further research is needed to clarify this relationship.

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Directions for Future Research

In conclusion, there is sufficient evidence to believe that social support is associated with health outcomes. However, there is still a need for further research to determine the exact extent of this association. The relationship between social support and health outcomes is complex and requires further investigation. Future research should focus on understanding the mechanisms by which social support influences health outcomes. This includes examining the potential for social support to influence biological processes, such as immune function, and to influence psychological processes, such as stress response. Further research is also needed to determine how social support influences health outcomes in different populations, including those with chronic diseases, mental health disorders, and other health conditions. Ultimately, this research will help us better understand the potential for social support to improve health outcomes and inform the development of effective interventions.
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