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B.A., University of Colorado - Boulder, 2004

Thesis Committee Chair: Rob Stephenson, PhD

An abstract of

A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University

in partial fulfillment of the requirements for the degree of
Master of Public Health
in Hubert Department of Global Health

2014

Abstract

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Limited research has examined how multiple psychosocial factors shape linkage to and retention in HIV care for men who have sex with men (MSM). To address this gap, survey data on depression, internal HIV stigma, perceived negative health, HIV status disclosure, social support, and resilience were collected for 201 HIV-positive MSM in Atlanta, GA. MSM without depression had greater odds of being linked to care compared to those with depression (OR=2.58; 95% CI: 1.1, 6.02). More social support was associated with retention in HIV care (OR=1.71; 95% CI: 1.16, 2.51). MSM aged 18-29 (p=0.003) and 30-39 (p=0.01) with higher levels of resilience had poorer retention. Resilience interacted with depression in their association with retention (p=0.006). Tailored interventions are needed to address the different psychosocial barriers affecting linkage to and retention in HIV care among MSM.

Keywords: HIV, men who have sex with men (MSM), psychosocial, barriers, linkage, retention

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CONTENTS

CHAPTER I: INTRODUCTION

The first official reporting of what became to be known as AIDS occurred on June 5, 1981, when the U.S. Centers for Disease Control and Prevention (CDC) published a Morbidity and Mortality Weekly Report (MMWR) describing a rare lung infection, *Pneumocystis carinii pneumonia,* in five young, previously healthy, gay men in Los Angeles (1). Ever since this MMWR report, gay, bisexual, and other men who have sex with men (MSM) have been the population most profoundly affected by the HIV/AIDS epidemic in the U.S. (2). While advances in antiretroviral therapy (ART) over the past fifteen years have prolonged the lives of people living with HIV, successful treatment depends on timely linkage to and sustained retention in HIV care, with the ultimate goal of achieving viral suppression (3). Although a great body of research has illuminated the multiple dimensions affecting HIV care engagement among MSM, most of this research has focused on predisposing factors such as race and age or enabling factors like income and insurance (4-6) . Far less attention has been paid to psychological distress and social mores affecting MSM that could preclude or impede HIV care engagement. Therefore, a further understanding on the confluence of psychosocial factors shaping linkage to and retention in HIV care among MSM is needed to influence interventions designed to prolong survival, achieve viral suppression, and prevent onward transmission.

OBJECTIVES & AIMS OF STUDY

The objective of this study is to examine how elevated levels of depression, internal HIV stigma, and perceived negative health, and low levels of HIV status disclosure, social support, and resiliency shape linkage to and retention in HIV care among HIV-positive MSM in Atlanta, GA. Included in this objective are several aims:

1. To describe the reported levels of psychosocial factors among HIV-positive MSM linked to and retained in HIV care.
2. To examine the bivariate associations between psychosocial factors and HIV care linkage and retention.
3. To examine the multivariate associations between psychosocial factors and HIV care linkage and retention.
4. To examine how the interaction between psychosocial factors can influence linkage to and retention in HIV care.

THE HIV/AIDS EPIDEMIC AMONG MSM IN THE U.S.

As of 2011, an estimated 1.1 million people in the U.S. were living with HIV and almost 1 in 6 (16%) were unaware of their infection (2). MSM accounted for 52% of all people living with HIV infection in 2009, the most recent year these data are available (2). Over the past decade, the number of people living with HIV has increased while the number of new infections has remained steady at about 50,000 per year (7). Despite the steady number of new HIV infections each year, the pace of new infections continues at too high a level for certain groups—particularly MSM.

Although MSM represented only 4% of the U.S. male population in 2010, they accounted for 78% of new HIV infections among males and 63% of all new infections (7). The estimated number of new HIV infections among MSM increased by 12% from 26,700 in 2008 to 29,800 in 2010 (7).

Moreover, the estimated number of new HIV infections among MSM youth aged 13-24 increased at an even higher rate of 22% from 7,200 in 2008 to 8,000 in 2010 (7). These increases are present despite stable or modest decreases in the number of increases observed through injection drug use and heterosexual contact (7).

As expected, the percentage of HIV diagnoses is commensurate with HIV infections among MSM. In 2011, an estimated 62% of all diagnosed infections were attributed to male-to-male sexual contact (Figure I)(8).

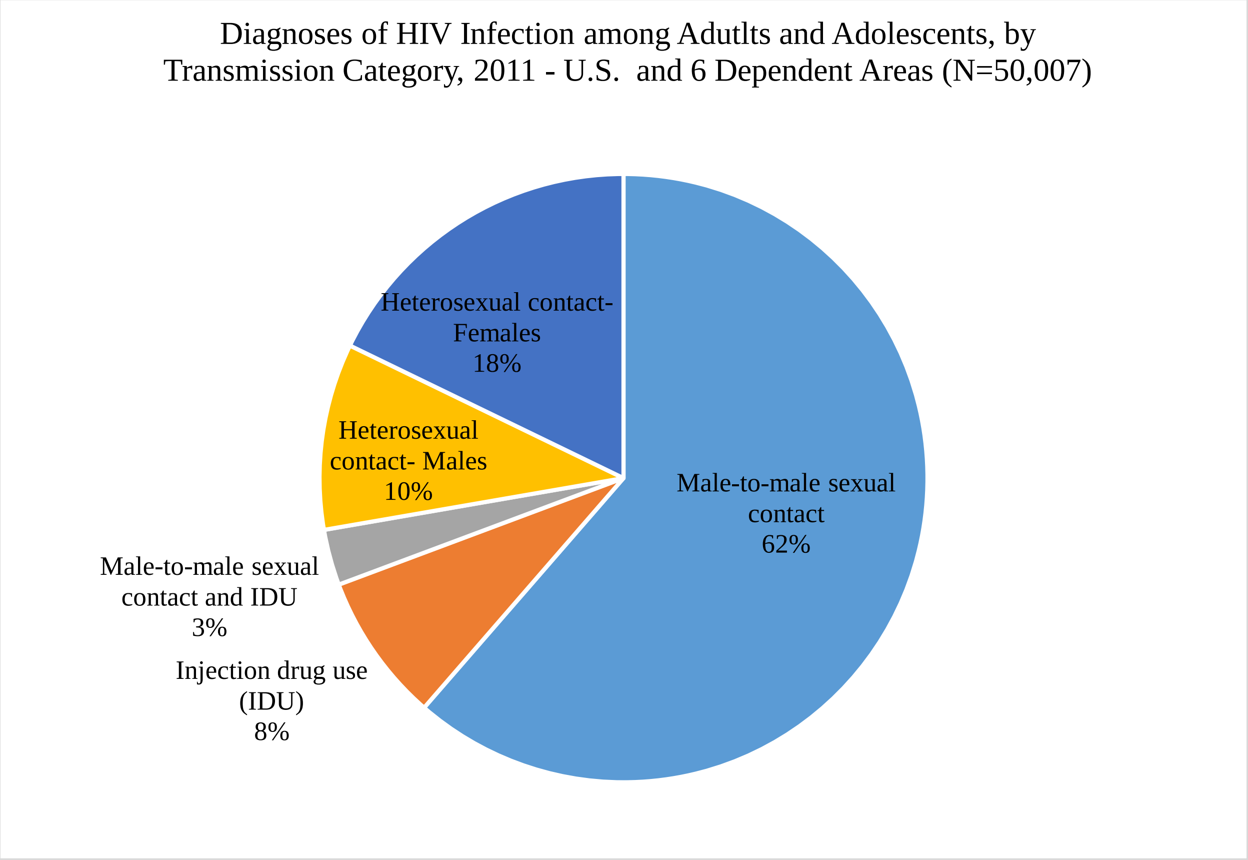

Figure I: Diagnoses of HIV Infection among Adults and Adolescents, by Transmission Category, 2011 - U.S. and 6 Dependent Areas (N=50,007)(8)

However, these diagnoses are not evenly distributed over a homogenous MSM population. The South had more diagnoses of HIV infection among MSM (n=14,384) in 2011 than any other region

(8). Furthermore, while African American MSM are a fraction of the overall MSM population, they accounted for 38% (n=11,810) of total MSM HIV infections followed by white MSM at 34% (n=10,375) and then Latino MSM at 24% (n=7,266) (8).

HIV CARE ENGAGEMENT AMONG MSM

For HIV-positive MSM, engaging in HIV care is crucial to improving their health, achieving viral suppression, and preventing onward transmission—especially in the wake of increasing infections. In fact, President Obama's National HIV/AIDS strategy calls for more emphasis on addressing HIV prevention and care needs of MSM (9). This strategy promotes the use of ART as treatment *and* prevention (3, 9). ART not only prolongs life, but also reduces transmission of HIV because suppressed levels of circulating virus makes HIV-infected persons less infectious (10). In order to prevent onward transmission of HIV through ART, HIV infected individuals have to be fully engaged in care and achieve viral suppression (defined as having a viral load <200 copies/mL) (3, 10). The two main components of HIV care engagement are linkage and retention and represent distinct processes on the engagement in care continuum (Figure III) (11).

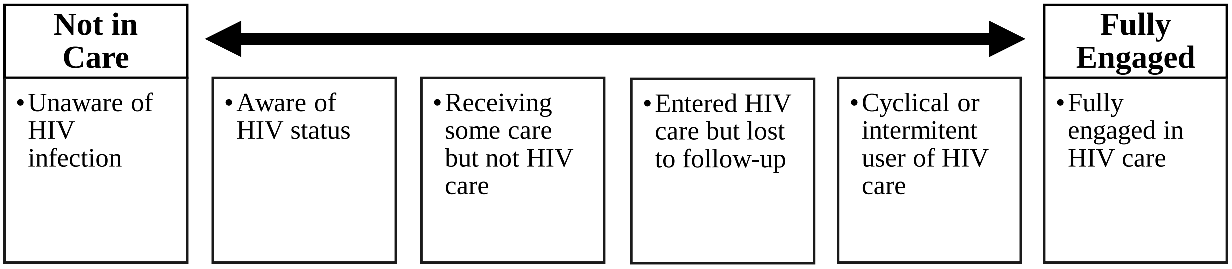

Figure III. The continuum of engagement in HIV care as represented by the Health Resources and Services Administration (HRSA) (11)

A successful linkage to an HIV clinic or provider must occur before patients can be retained in care over time. Failure to initiate HIV care within ninety days after a diagnosis is common (3). Longer delays in linkage with medical care are associated with greater likelihood of progression to AIDS by CD4 cell criteria (3). Measuring linkage to care on a national level is somewhat challenging given varying definitions. Many studies of patients initiating HIV care use “1 visit with a provider” within three months of an HIV diagnosis as a marker of linkage; these visits range from receipt of confirmatory results after a rapid test to a comprehensive HIV clinic intake to a visit with the patient’s primary care provider (12). Other studies and public health departments use evidence of CD4 cell count and viral load measurements as markers of linkage (13). According to the Georgia Department of Public Health, 57% of MSM diagnosed with HIV in 2011 were linked to care (Figure III) (14). The percentage of HIV-infected MSM linked to care is actually lower as undiagnosed HIV–infected MSM were not a part of this calculation.

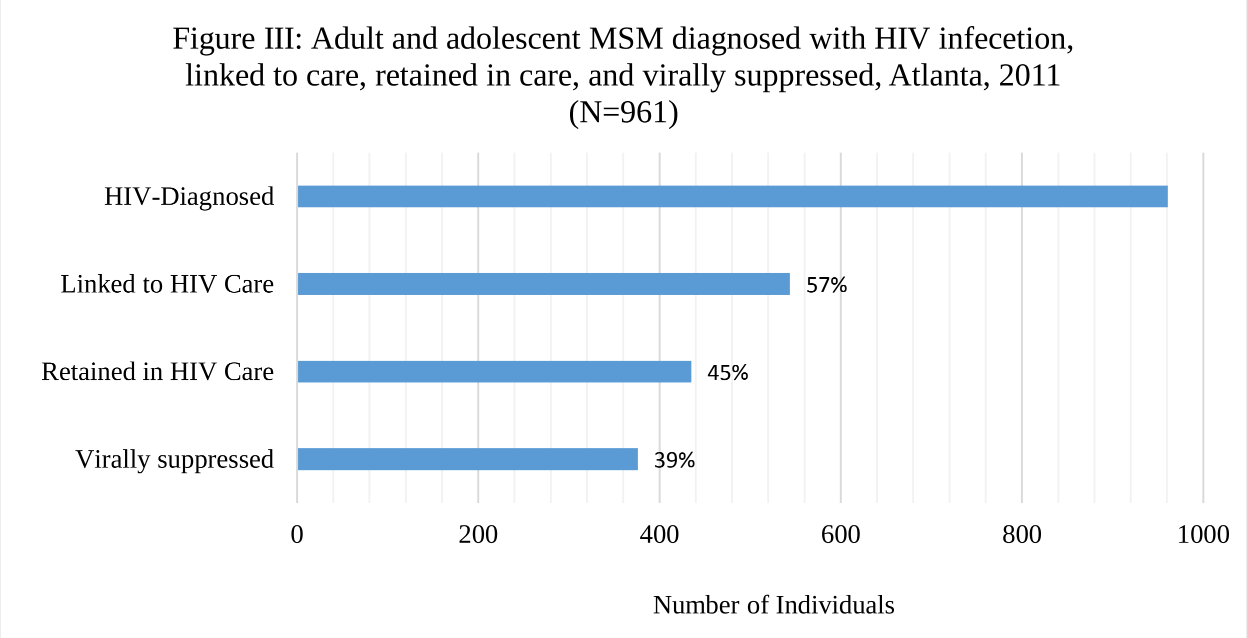

Figure III: Adult and adolescent MSM diagnosed with HIV infection, linked to care, retained in care, and virally suppressed, Atlanta, 2011 (N=961) (14)

Successful HIV treatment requires sustained engagement in HIV care (12). Among HIV-positive individuals, opportunistic infections, such as *Pneumocystis jirovecii* pneumonia, are most common in individuals with unknown HIV infection and in those who are not receiving HIV care (15, 16).

However, it is crucial to note that retention is not an "all or nothing" phenomenon and that patients may represent a cyclical pattern of being in and out of care (Figure II)(17). At least three different approaches to measuring retention in care exist in the current body of literature: using measures that incorporated missed visits, setting a standard for an expected number of HIV care visits in a given time period, and categorizing patients according to their patterns of health usage (regular, sporadic, non-engaged) (18). While national retention prevalence for MSM is unknown, in a national cohort study of American veterans, being MSM was associated with improved adherence to HIV care visits in all quarters of a year (19). In Atlanta, Approximately 55% (n=529) of HIV-diagnosed MSM in 2011 were not engaged in regular HIV care (Figure III)(14). As a result, these men do not have sustained access to ART, prophylactic medications, or other medical services (3). Those who receive ART intermittently are at increased risk of viral resistance (20). For these reasons, poor engagement in care is associated with poor health outcomes and increased mortality (21). In addition, these individuals contribute to ongoing HIV transmission in the community (3).

ART ADHERENCE & VIRAL SUPPRESSION

Over the past decade, ART has become more potent, better tolerated, and less complex (3). Today, most HIV-infected individuals receiving combination ART achieve an undetectable plasma HIV-RNA level (viral load) (22). To avoid treatment failure and development of resistance virus strains, high levels of ART adherence are necessary (23, 24). Until recently, ART was recommended only for advanced stages of the disease. In March 2012, the department of Health and Human Services recommended ART in all stages of the disease (10). A meta-analysis of 31 North American adherence studies found that 55% of HIV-infected individuals achieve adequate adherence (25). Because ART has become more effective, better treatment outcomes can be achieved despite lower adherence (3). With modern initial ART, 70%-80% adherence leads to durable viral suppression in most individuals (26). The CDC published a report in the MMWR about viral suppression among HIV-infected individuals retained in care in Georgia (10). They found that 66% of HIV-positive MSM who were retained in care achieved viral suppression (viral load <200 copies/mL). Per transmission category, the percentage reaching viral suppression of male-to-male sexual contact was similar to that of injection drug use and was lower but in the range of the other transmission categories (male-to-male sexual contact and injection drug use, heterosexual contact, and other) (10).

PSYCHOSOCIAL BARRIERS TO HIV CARE ENGAGEMENT

In 2011, 57% of HIV-diagnosed MSM in Atlanta were not linked to HIV care (Figure III)(14). Of those linked to care, 45% were retained (Figure III)(14). Finally, only 39% of those retained in care achieved viral suppression (Figure III)(14). It is no wonder that even with advances in ART, the incidence of HIV is increasing among MSM. Considering the fact that viral suppression depends on ART adherence and ART adherence is hinged upon HIV-infected individuals being linked to and retained in care, much progress needs to be made in regards to HIV care engagement.

Most of the current literature surrounding barriers to HIV care engagement among MSM focuses on predisposing or enabling factors. There is a dearth of research that examines how MSM specific psychological distress and social mores shape HIV care. Other than substance use disorders, depression is the most prevalent psychiatric disorder among HIV-positive adults (27). A study on HIV care engagement among MSM found that half of research participants had active depressive symptoms (5). Previous studies of HIV-infected adults have found associations between stigma and depressive symptoms (28-30). In the context of HIV, stigma may lead to social exclusion and discrimination, and has the potential to affect HIV testing, non-adherence to ART, poorer self-assessed mental and physical health, and reluctance to disclose HIV status to others (30-33). Status disclosure is particularly important as it is associated with support from social network members in managing HIV and mitigating feelings of stigmatization and depression (33-37). A cross-sectional study examined the roles of social support, stress, stigma, and HIV disclosure in HIV care engagement and found status disclosure to more social networks was the greatest predictor for retention in HIV care (35). Lastly, social support and status disclosure are important resilience factors that researchers have explored when assessing HIV care outcomes (38, 39).

Depression, stigma, perceived negative health, lack of HIV disclosure to social networks, low social support and resiliency are some reasons cited for psychosocial distress among HIV-positive MSM (28, 31, 35, 36, 38, 40-42). Investigating psychosocial barriers to linkage to and retention in HIV care among MSM will add to the current body of literature on care engagement. We believe our study could aid in developing interventions designed to prolong life, achieve viral suppression, and thereby reduce the risk of onward transmission.

CHAPTER II: MANUSCRIPT

Psychosocial barriers to linkage to and retention in HIV among MSM in Atlanta

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Contribution of student

This work herein is the product of a secondary data analysis performed by the student. The student did not have a role in producing the survey or the collection of data through survey implementation. However, the student did perform all work after data collection independently, including the analysis of the data, the construction of regression models, summation of results in tables and figures, and all writing. Advisement throughout this process was provided by the student's thesis advisors.

Abstract

Psychosocial barriers to linkage to and retention in HIV care among MSM in Atlanta

By Ryan Derni

Limited research has examined how multiple psychosocial factors shape linkage to and retention in HIV care for men who have sex with men (MSM). To address this gap, survey data on depression, internal HIV stigma, perceived negative health, HIV status disclosure, social support, and resilience were collected for 201 HIV-positive MSM in Atlanta, GA. MSM without depression had greater odds of being linked to care compared to those with depression (OR=2.58; 95% CI: 1.1, 6.02). MSM aged 18-29 (p=0.003) and 30-39 (p=0.01) with higher levels of resilience had poorer retention. Resilience interacted with depression in their association with retention (p=0.006). Tailored interventions are needed to address the different psychosocial barriers affecting linkage to and retention in HIV care among MSM.

Keywords: HIV, men who have sex with men (MSM), psychosocial, barriers, linkage, retention

INTRODUCTION

In the U.S., men who have sex with men (MSM) remain the population most greatly affected by HIV (2). While MSM represented only 4% of the U.S. male population in 2010, they accounted for 78% of new HIV infections among males and 63% of all new infections (7). Aside from HIV, gay and bisexual men and other MSM also have more adverse mental health outcomes compared to the general adult male population, including higher levels of depression and suicidal ideation (40, 41). Depression, stigma, perceived negative health, lack of HIV disclosure to social networks, low social support and resiliency are some reasons cited for psychosocial distress among HIV-positive MSM (28, 31, 35, 36, 38, 40-42). Many studies have examined psychosocial barriers to HIV testing, delays in seeking care, adherence to antiretroviral therapy (ART), and quality of life (5, 35, 43). However, very few have looked at the association of multiple psychosocial barriers on linkage to and retention in HIV care. This relationship is worthy of investigation as inadequate HIV care engagement has been associated with suboptimal adherence to ART, more community viral resistance, increased HIV transmission, and poorer survival rates (21, 44).

Overall, HIV-positive MSM have been shown to do better than other risk groups with regard to engagement in care (5). A successful linkage to an HIV clinic or provider must occur before patients can be retained in care overtime. Failure to initiate HIV care within ninety days after a diagnosis is common (3). Longer delays in linkage with medical care are associated with greater likelihood of progression to AIDS by CD4 cell count criteria (3). Successful HIV treatment requires sustained retention in HIV care (12). Approximately 50% of known HIV-infected individuals in the U.S. are not retained in regular HIV care (3). As a result, these individuals do not have sustained access to ART, and are more likely to have poorer health outcomes, increased mortality, and to not be virally suppressed and therefore risk onward transmission (3).

Some researchers suggest that depression may be a risk factor for the progression of AIDS, perhaps in part because it is associated with poor management of the disease (45). Two large cohort studies found associations between chronic depression and AIDS-related mortality (46, 47). One study found that depression was associated with poorer medication adherence and HIV viral control (48). Furthermore, patients who were using anti-depressants had a viral load similar to other non-depressed patients, most likely a result from increased ART adherence (48). While these findings help illustrate how the treatment of depression can impact AIDS-related mortality, limited research has focused on the association between depression and linkage to and retention in care, which are essential proximal behaviors to ART adherence.

Depression is just one possible factor shaping engagement in care and is interrelated with a host of other psychosocial factors. Previous studies have found associations between stigma and depressive symptoms (28-30), as well as an association between stigma and low levels of retention in care and ART adherence (31, 35, 43). A study by Sayles et al. found that mental health attenuated the association between stigma and suboptimal ART adherence, and suggested that the relationship by stigma and ART adherence is mediated by mental health (43).

The association between stigma and HIV care engagement is particularly important for HIV-positive MSM who are living with a disease that may put them at risk of experiencing HIV-related stigma. Often, these men cope with internal stigma leading to personal feelings of shame, guilt, and hopelessness due to their HIV status or their sexual identity (49). In the context of HIV, internal stigma may lead to social exclusion and discrimination and has the potential to affect HIV testing, reluctance to disclose HIV status to others, non-adherence to ART, and poorer self-assessed mental and physical health (30-33).

HIV status disclosure is an important concept to examine as it is associated with support from social network members in managing HIV and mitigating feelings of stigmatization and depression (33-37). A cross-sectional study examined the roles of social support, stress, stigma, and HIV disclosure in HIV care engagement and found disclosure to more social networks was the greatest predictor for retention in HIV care (35). Furthermore, social support and disclosure are important resiliency factors that researchers have explored when assessing HIV care outcomes (38, 39). There is a dearth of research on the concept of resiliency and HIV care engagement; its relatedness to social disclosure and support suggests that it is an important measure to investigate. Several studies of HIV-positive patients have found a positive association between increased social support and clinical outcomes and adherence to ART (50-52). Examining the role of HIV disclosure and social support is crucial to understanding how these factors help HIV-positive MSM manage and care for the disease.

It is important to gain an understanding of the impact of psychosocial barriers on HIV care engagement. In our study, we hypothesized that among HIV-positive MSM, elevated levels of depression, stigma, and perceived negative health, along with low levels of status disclosure, social support and resilience are associated with lower levels of linkage to and retention in HIV care. Results are presented from a study of the association between these domain variables and HIV care engagement from a sample of HIV-positive MSM in Atlanta.

METHODS

STUDY DESIGN

The *Engage Study* was a cross-sectional study of 210 self-identified HIV-positive MSM living in the Atlanta metro area that explored potential structural and psychosocial barriers to accessing HIV care and treatment. HIV-positive MSM over the age of eighteen were recruited from October 2012 to June 2013 through two sources: 1) re-contact from two previous Emory studies and, 2) from Facebook banner advertisements. Men who previously tested HIV-positive during two other Emory based studies of MSM and agreed to be re-contacted for participation in other research studies were offered participation by phone and email. The study sample recruited from the previous two studies was limited to the non-Hispanic black and white races, as only self-reporting non-Hispanic black and white MSM were eligible to participate in these studies. Participants from the two studies were primarily recruited through venue-based sampling in Atlanta or peer referral as described previously (53). In total, 128 participants were recruited through this method.

Facebook banner advertisements targeted approximately 40,000 men who listed an interest in meeting other men or listed “LGBT” or “gay” as interests on their Facebook profiles, and lived within 50 miles of Atlanta. Those who clicked on the advertisement were directed to the same eligibility survey and consent form that men recruited from the other two studies completed. Eighty-two (0.21%) men recruited from Facebook were eligible and participated. The study protocol was approved by the Institutional Review Board at blind for review (approval number: IRB00060430). Further details on the study design are found elsewhere(54). The final sample size was 201 HIV-positive MSM; 6 (3%) were excluded as a result of listing their race as “other”, 2 (1%) because of missing data on depression, and 1 (0.5%) because of missing data on community perceptions of HIV and perceived HIV health symptoms.

MEASURES

The primary outcomes of interest are linkage to and retention in HIV care. This study follows the Institute of Medicine (IOM) guidelines for linkage to care which stipulates that 1) HIV-positive patients receive treatment from a provider within three months of their HIV diagnosis and, 2) test their viral load and CD4 count on the first visit (55). We asked participants the month and year they learned of their HIV-positive status as well as the date they first saw a doctor, nurse, or other health care worker for treatment. Participants were coded as linked to care if the difference between seeking treatment and learning of their HIV diagnosis was three months or less. The date of the first viral load test and CD4 count was not part of our linkage coding method because we did not ask this information. A subset sample among those linked to care and who were diagnosed 12 months or more before the survey was used to determine HIV care retention. The IOM considers HIV-positive patients retained in care if 1) they seek treatment for HIV from a care provider at least once every 6 months and, 2) have 2 viral load tests in 12 months (55). In this study, participants were asked how many HIV care appointments they scheduled in the past 12 months and of those scheduled how many they had missed. They were also asked how many viral load tests they took in the last 12 months. Participants were coded retained in care if the difference between the appointments scheduled and missed was 2 or more (averaging at least 1 appointment every 6 months) and had taken 2 or more viral load tests in the 12 month timeframe.

The following psychosocial barriers were examined as possible correlates of linkage to and retention in HIV care: depression, internal HIV stigma, perceived negative health, HIV status disclosure, HIV social support, and resilience. Depression was assessed using the 10-item Center for Epidemiologic Studies Depression Scale (CESD-10) (56), which was previously validated for HIV-positive participants (57). The CESD-10 asked participants to rate the items, which included statements like “I felt depressed” and “I felt lonely”, using a four-point Likert scale ranging from “0=Rarely or none of the time” to “3=Most or all of the time.” Responses were coded numerically and summed to give a composite score between 0 and 30. Eight of the ten questions were negatively worded and were scored as is. The other two questions were positively worded and therefore reverse coded so that higher scores equaled higher levels of depressive symptoms.

Scores equaling 10 or higher were indicative of clinical depressive symptoms; therefore, participants with these scores were coded as depressed (56).

Internal HIV stigma was measured using a subset of the previously validated Berger HIV stigma scale and had an overall reliability coefficient of (Cronbach's alpha) of 0.89 (58). The six item scale was used to measure how HIV stigma was individually felt by asking participants to rate how strongly they agreed with statements like "I am ashamed that I am HIV positive", and "It is difficult to tell people about my HIV infection". The six items were each scored on a four point Likert scale ranging from "0=Strongly disagree" to "4=Strongly agree".

The perceived negative health measure (Cronbach's alpha=0.94) draws upon components of the SF-8 Health survey(59) and health and well-being questions from the Center for Disease Control and Prevention's Medical Monitoring Project questionnaire (60). Our perceived negative health scale was not previously validated but the SF-8 and MMP questions are useful in measuring physical health, emotional health, and somatization. The seven items asked participants to compare their health now to how they felt before having HIV by rating statements like "degree of physical pain you feel daily" and "how happy you feel, overall". The items were scored using a four point Likert scale ranging from "0=Feeling much better" to "4-Feeling much worse".

The HIV support measure was loosely based on different scales published in the literature and is not currently validated (Cronbach's alpha=0.84). The five item measure included questions like "you have someone you can talk to when you're feeling sad about your HIV status?" and "you can get a ride from a family member or friend to go to HIV care appointments?". Yes answers were summed to obtain a composite score between 0 and 5.

Resilience was measured using 10 of the 14-item Resiliency Scale (RS) statements by Wagnild and Young (Cronbach's alpha=0.94) (4). The shortened RS was not previously validated. The resilience scale measures a person's capacity to live a full and rewarding life by rating how strongly they agree with statements like "I am determined", and "my belief in myself gets me through hard times"(61). The 10 questions were each scored on a four point Likert scale ranging from "0=Strongly disagree" to "4=Strongly agree".

For all of the scales, data was imputed for one or two missing response(s) by imputing the mean of the other response(s) as the response for the missing item(s). Resilience, internal HIV stigma, perceived negative health, and HIV support scores were a sum of the individual items in each domain. Higher scores represent higher levels of the requisite domain.

HIV disclosure was measured using questions related to a participant's HIV status disclosure to social network members. We asked participants whether they had disclosed their HIV status to at least one person in each defined social network category that applied to them, such as parents, siblings, and colleagues. Yes responses were coded as "1", no responses were coded as "0", and does not apply responses were coded as "99". Responses were summed only for the categories that applied to them (participants who answered "yes" or "no"). The applicable categories were then summed, and disclosure was dichotomized based on whether or not participants answered yes to more than half of their applicable categories.

STATISTICAL ANALYSIS

The following four analytic approaches were used to assess the association between psychosocial barriers and linkage to and retention in HIV care: (1) Descriptive analyses of demographic, psychosocial, and HIV care variables; (2) Bivariate analyses of psychosocial barriers and HIV care outcomes; (3) Multivariate logistic regression models of psychosocial barriers on HIV care outcomes; (4) Descriptive analyses of significant interactions in the multivariate logistic regression models.

Descriptive statistics of demographic, psychosocial, and HIV care variables include counts and frequencies of the categorical variables and mean scores, standard deviations (SD), and interquartile ranges (IQR) of the continuous variables. All continuous variables, the psychosocial scales, were assessed for normality distribution and correlation. Bivariate analyses were conducted to compare the differences in mean scores of psychosocial barrier scales by linkage to and retention in care using the Wilcoxon-rank sum test. Mean scores, standard deviations, IQRs, test statistics, and p-values are presented.

Development of multivariate logistic models was based on a multi-step screening process using psychosocial barriers as independent variables and socio-demographic characteristics as covariates of the outcomes linkage and retention. The HIV disclosure measure was not included in model building for retention due to convergence issues. Variables were assessed using backward elimination with a cutoff of $p < 0.1$. All possible two-way interactions were also tested using backward elimination. Confounding was not assessed due to the lack of statistical power in this study. Model fit statistics (Hosmer-Lemeshow goodness of fit test) and multi-collinearity were assessed in the final models.

During model building of the retention outcome we found three significant interactions: resilience by age, resilience by depressed, and depressed by age. Descriptive statistics of these interactions are presented in a graph. Statistical analyses were carried out using SAS 9.3 (SAS Institute, Cary, NC); overall statistical significance of individual variables was determined at the $p<0.05$ level.

RESULTS

Socio-demographic characteristics, HIV care outcomes, and psychosocial barrier data are presented in Table I. The median age at enrollment was 34 years. The majority of participants were employed at the time of the survey and reported an annual household income of less than $19,999 per year. About a third of the participants had a college education and a majority had health insurance. Forty percent had symptoms indicative of depression and the median number of social networks participants disclosed their HIV status to was five.

Eighty-five percent of participants sought treatment for their HIV within three months of being diagnosed. Of the 170 participants that were linked to care and diagnosed with HIV at least 12 months before the survey, 114 (79%) were retained in care. There were no significant differences in mean scores in any of the psychosocial scales and our outcomes of interest in the bivariate analyses (Tables II & III).

Table IV presents data from the multivariate model of psychosocial barriers associated with linkage and retention. In the multivariate analyses, participants without depression had greater odds of being linked to care compared to those with depression (Table IV, OR=2.58; 95% CI=1.1, 6.02). The final linkage model's estimates fit the data at an acceptable level according to the Hosmer-Lemeshow goodness-of-fit test (p=0.62). Participants with higher HIV support scores were more likely to be retained in care (Table IV, OR=1.71; 95% CI: 1.16, 2.51). There was a significant interaction between resilience and depression (Table IV, p=0.006). The individual effect of depression was associated with retention (Table IV, p=0.006). Resilience interacted with age-level (Table IV, p=0.004). Lastly, there was a significant interaction between depression and age-level (Table IV, p=0.03). The final retention model's estimates fit the data at an acceptable level according to the Hosmer-Lemeshow goodness-of-fit test (p=0.55). Overall, there were no issues with multi-collinearity between any of the variables in either model.

Figure I displays the reported resilience mean scores for MSM in this sample by retention stratified by depression. Participants who were depressed in this sample who were not retained in care reported a higher resilience score (Figure I). Figure II displays the reported resilience mean scores for MSM reported in this sample by retention stratified by age-level. Participants aged 18-39 in this sample who were not retained in care reported higher resilience scores compared to all other age groups (Figure II). Figure III displays the percentage of reported depression by age-level for MSM in this sample. Participants aged 18-29 in this sample was the only age group with a higher reported percentage of depression in those not retained in care compared to those retained in care (Figure III). Furthermore, depression of those not retained in care among this sample steadily decreased by age group until age 50 while depression increased by age group among those retained in care (Figure III).

DISCUSSION

In our study, we found that depression was significantly associated with both linkage and retention but in very different ways. Not surprisingly, participants with indications of depressive symptoms were less likely to be linked to care. This finding suggests that depression may cause delays in seeking care after an HIV diagnosis and further supports the study by Bhatia et al. which found that depression was a borderline predictor of unsuccessful linkage (62). Furthermore, depression and resilience interact in their association with retention. We observed that among participants who did not have depressive symptoms, resilience scores were higher in participants who were retained in care compared to those who were not retained. The opposite is true for those with depressive symptoms where we observed higher resilience scores in participants not retained in care. The observed trend indicates resiliency could be protective of depression among those retained in care. However, when resilience is stratified by depression status neither interactions are significant so caution is needed when interpreting this observation. Further investigation with a larger sample size is needed to substantiate this trend.

Additionally, we found that depression was associated with age. Participants aged 18-29 who were not retained in care had higher levels of depression compared to those who were retained in care. This finding is similar to other associations between depression and sub-optimal ART adherence (45, 48). However, the comparison of this trend to ART adherence is only true for participants aged 18-29. Further research is needed to clarify age differences in the prevalence of depression by retention status among MSM. Moreover, we also found that the association between resilience and retention was dependent on age. Participants aged 18-39 who were not retained in care had higher levels of resilience. There's no clear explanation for this finding. One possible reason for this observation could be that high levels of resiliency led participants to underestimate the need for care due to strong perceived feelings of will-power and self-determination. Further research is needed to elucidate this finding.

As expected, HIV specific support was significantly associated with retention in care which corroborates many other studies (35, 36, 42). However, this is a cross-sectional study, so men may have gained social support as part of the engagement in care process, rather than social support leading to engagement in care. Similar to two other Wohl et al. studies, we found no associations in our bivariate analyses of our psychosocial measures and care outcomes because of strong correlated data that we did not see until modeling where some of these measures became independently associated with our outcomes (28, 35).

In contrast to previous studies, we found no significant association with internal HIV stigma and linkage to or retention in care (30, 31, 35). It's worth noting that the Wohl et al. (2011) study only found an association between internalized HIV stigma and retention in a multivariate model where participants had disclosed their HIV status to social network members (35). Additionally, Vanable, et al. used a different measure for retention in care, the number of missed appointments, compared to our measure (30).

There are a number of limitations in this study worth mentioning. First, this study is cross-sectional so causal associations cannot be determined. It is possible, for example, that lack of linkage to HIV care actually increases depressive symptoms as these men are not seeking care from a provider to help them cope with their diagnosis, rather than depression leading to a lack of linkage to care. Second, all survey responses are self-reported so there may be issues of response and recall bias. Third, the small sample sizes most likely eroded the statistical power to test for associations in the bivariate analyses and led to wide confidence intervals for some of the effect estimates in our multivariate analyses. Fourth, HIV disclosure was not a part of the retention multivariate logistic model due to convergence issues resulting from a small sample size. Fifth, the CES-D scale is a screening test that does not diagnose depression; however, it has been used in lieu of a clinical diagnosis used in many studies. Sixth, although the resilience and perceived negative health scales had strong internal reliability coefficients, these scales were not previously validated. Lastly, we recruited from a previous study looking at racial disparities, so we don't have a sample with full racial and ethnic diversity.

Overall, these findings elucidate the relationship between key psychosocial factors affecting HIV-positive MSM and care seeking behaviors. The data suggest that interventions designed to address or treat depressive symptoms could lead to increased linkage to care among MSM. Further research is needed to assess how addressing or treating depression would positively affect retention, particularly among MSM under age 30. Moreover, we recommend that future research focus on the role of resiliency on depression and age for retention in care. Specifically, resilience campaigns designed to help HIV-positive MSM cope with the disease may need to be coupled with proper HIV care engagement strategies, particularly for men under age 40. The data also indicate that interventions designed to help HIV-positive MSM seek support from social network members would help them remain in care. Our findings demonstrate that tailored interventions are needed to address the different psychosocial barriers affecting linkage to and retention in care.

TABLES & FIGURES

Table I. Characteristics of a sample of HIV-positive men who have sex with men in Atlanta, October 2012 - June 2013

Characteristic	Overall (N=201)	
Socio-demographics	**N**	**%**
Age		
18-29	56	28
30-39	82	41
40-49	40	20
50-62	23	11
Race[a]		
White	72	36
Black	124	62
Education[b]		
College, post graduate, or professional school	66	33
Some college, associate's degree, and/or technical school	96	48
High School, GED, or some high school	38	19
Employment Status		
Currently employed	116	58
Unemployed	85	42
Income[c]		
$0-$9,999	48	24
$10,000-$19,999	59	29
$20,000-$39,999	31	15
$40,000-$74,999	32	16
$75,000+	25	12
Insurance Status[d]		
Not insured	89	44
Currently Insured	110	55
HIV Care Outcomes		
Linked to HIV Care		
No	31	15
Yes	170	85
Retained in HIV Care[c, e]		
No	31	21
Yes	114	79

Psychosocial Barriers			
Depressed			
No	121	60	
Yes	80	40	
Disclosed HIV Status to Social Networks			
No	63	31	
Yes	138	69	
Psychosocial Barrier Scales	**Mean**	**SD**	**IQR**
Internal HIV Stigma[b]	10.28	6.47	6, 15
HIV-Specific Social Support [c]	3.81	1.65	3, 5
Resilience[d]	32.46	7.75	30, 39
Perceived Negative Health	13.85	7.79	9, 19
Depression	8.7	6.32	3.33, 12

[a] Response missing for 5 participants

[b] Response missing for 1 participant

[c] Response missing for 6 participants

[d] Response missing for 2 participants

[e] Among participants who were linked to HIV care and were diagnosed 12 months or more before the survey

Table II. Comparison of mean scores for depression, internal HIV stigma, perceived negative health, HIV-specific social support, and resilience, of men who have sex with men in Atlanta by linkage to HIV care, October 2012 - June 2013 (n=201)

	Not Linked (N=31)			Linked (N=170)			*t* Test	P-Value
	Mean	SD	IQR	Mean	SD	IQR		
Depression	10.18	6.49	4, 15	8.44	6.27	3.33, 12	3547	0.16
Missing	0	-	-	0	-	-		
Internal HIV Stigma	9.93	7.49	4, 17	10.34	6.29	6, 15	2915	0.73
Missing	1	-	-	0	-	-		
Perceived Negative Health	15.83	6.12	12, 19	13.86	7.67	9, 19	3465	0.26
Missing	0	-	-	0	-	-		
HIV-Specific Social Support	3.83	1.51	3, 5	3.8	1.68	3, 5	2881	0.82
Missing	1	-	-	5	-	-		
Resilience	31.86	5.93	30, 37	32.57	8.04	30, 39	2613.5	0.18
Missing	1	-	-	1	-	-		

Table III. Comparison of mean scores for depression, internal HIV stigma, perceived negative health, HIV-specific social support, and resilience, of men who have sex with men in Atlanta by retention in HIV care, October 2012 - June 2013 (n=145)

	Not Retained (N=31)			Retained (N=114)			*t* Test	P-Value
	Mean	SD	IQR	Mean	SD	IQR		
Depression	8.75	6.80	6, 12	8.28	6.20	3, 12	2934.5	0.80
Missing	0	-	-	0	-	-		
Internal HIV Stigma	9.87	5.91	6, 13	10.05	6.14	5, 15	22232	0.88
Missing	0	-	-	0	-	-		
Perceived Negative Health	11.71	8.64	3, 18	14.50	7.52	12, 19	1968	0.15
Missing	0	-	-	0	-	-		
HIV-Specific Social Support	3.37	1.87	2, 5	3.99	1.50	3, 5	1816.5	0.06
Missing	1	-	-	1	-	-		
Resilience	32.03	6.34	30, 38	32.87	8.03	29, 39	2064.5	0.59
Missing	1	-	-	0	-	-		

Table IV. Multivariate logistic models of psychosocial barriers associated with linkage to and retention in HIV care among men who have sex with men in Atlanta, October 2012 - June 2013

Factor	Linkage (N=201)[a, b] OR (95% CI)	P-value	Retention (N=145)[c, d] OR (95%CI)	P-value
Depressed[e]	-	-	-	0.006
No	2.58 (1.10, 6.02)	0.03	-	-
Yes	Ref	-	-	-
HIV-Specific Social Support[e]	-	0.30	1.71 (1.16, 2.51)	0.006
HIV-Specific Social Support by Insurance		0.06	-	-
Not Insured	0.38 (0.12, 1.21)	0.10	-	-
Insured	1.175 (0.87, 1.59)	0.30	-	-
Perceived Negative Health	-	-	1.07 (0.99, 1.14)	0.07
Resilience[e]			-	0.47
Resilience by Depressed[e]	-	-	-	0.006
Not Depressed	-	-	-	0.47
Depressed	-	-	-	0.10
Resilience by Age[e]	-	-	-	0.005
18-29	-	-	-	0.003
30-39	-	-	-	0.01
40-49	-	-	-	0.29
50-62	-	-	-	0.47
Depressed by Age[e, f]	-	-	-	0.03
18-29	-	-	-	0.02
30-39	-	-	-	0.009
40-49	-	-	-	0.001
50-62	-	-	-	0.006

[a] 11 observations deleted from model building due to missing values

[b] Model controls for insurance

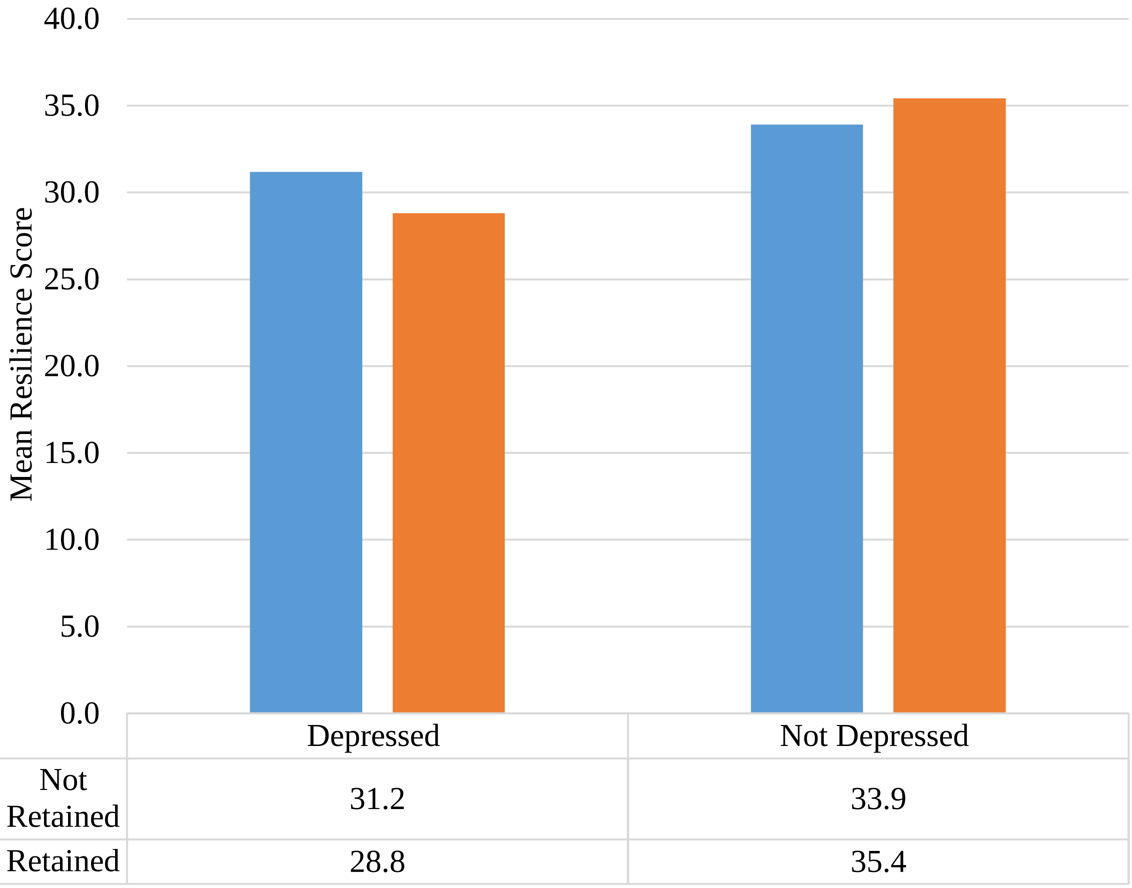
[c] 9 observations deleted from model building due to missing values

[d] Model controls for age

[e] Odds ratio(s) not presented for model because of interaction

[f] Not-depressed referent

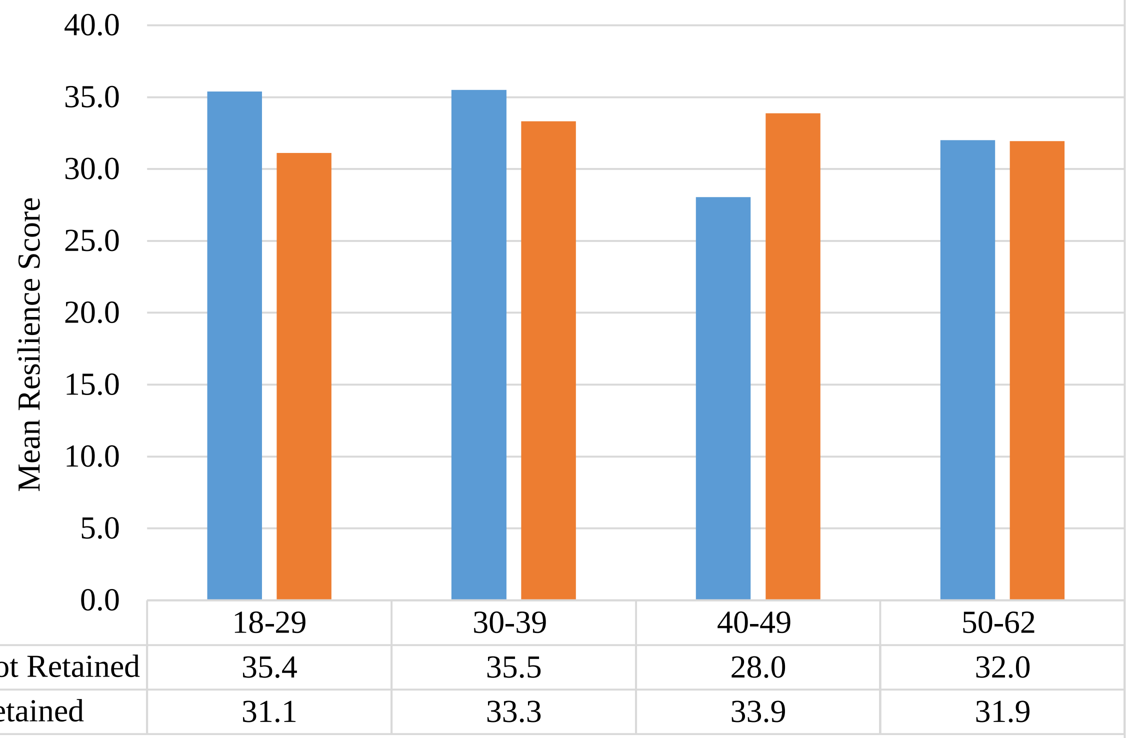
Figure I. Resilience mean scores of a sample of men who have sex with men in Atlanta by retention in HIV care stratified by depression, October 2012 - June 2013 (n=145)[a]



	Depressed	Not Depressed
🟦 Not Retained	31.2	33.9
🟧 Retained	28.8	35.4

[a]Response missing for 1 participant

Figure II. Resilience mean scores of a sample of men who have sex with men in Atlanta by retention to care stratified by age-level, October 2012 - June 2013 (n=145)



	18-29	30-39	40-49	50-62
🟦 Not Retained	35.4	35.5	28.0	32.0
🟧 Retained	31.1	33.3	33.9	31.9

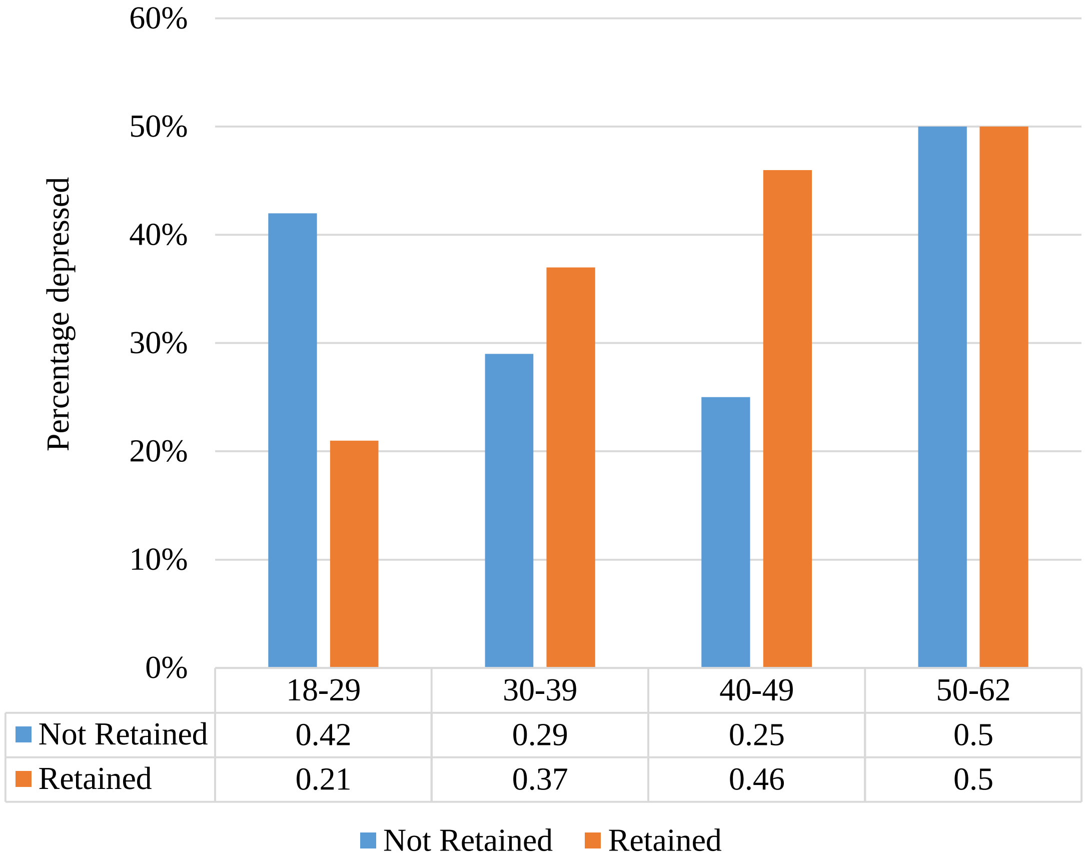


Figure III. Percentage of depression of a sample of men who have sex with men in Atlanta by retention stratified by age-level, October 2012 - June 2013 (n=145)

	18-29	30-39	40-49	50-62
🟦 Not Retained	0.42	0.29	0.25	0.5
🟧 Retained	0.21	0.37	0.46	0.5

CHAPTER IV: CONCLUSION & RECOMMENDATIONS

The results of this study are clear; psychosocial factors play a significant role in shaping HIV care engagement among MSM—a notion under-represented in the current body of literature. In fact, in an article about HIV care linkage and retention among MSM, Christopoulos et al. suggested that future studies focus on the relatedness of psychosocial factors influencing HIV care utilization and ART adherence (5). Given the burden of the HIV infection epidemic among MSM, the lack of research on strategies that successfully engage MSM is quite striking. In an era where ART can prolong survival and suppress the viral load of HIV-infected individuals, a strong public health response to these psychosocial barriers has the potential to significantly improve health outcomes and curb the epidemic. This response should engender future studies and tailored interventions on known psychosocial barriers to linkage and retention in HIV care.

SCREEN FOR DEPRESSION AT HIV TESTING SITES

In this study, participants with indications of depressive symptoms were less likely to be linked to care. This finding suggests that depression may cause delays in seeking care after an HIV diagnosis and further supports the study by Bhatia et al., which found that depression was a borderline predictor of unsuccessful linkage (62). Recent HIV-diagnosed MSM who exhibit depressive symptoms may undergo greater psychological duress due to their sero-positive status, and therefore may lack self-efficacy to seek HIV care. However, there is temporal ambiguity in this study, so it is possible that MSM who are diagnosed with HIV may experience declining mental health because they are not seeking care from a provider to help them cope with their new diagnosis. Regardless, it is recommended that HIV counselors at testing sites be trained in screening for signs of depression. Strong negative reactions elicited by an HIV diagnosis can be easily conflated with anxiety and depression; therefore, specialized training in recognizing the top two or three signs of depression is suggested. Also, a simple pre-HIV test questionnaire could ask participants if they are currently or have ever experienced symptoms of depression. If HIV counselors or testers suspect mental health issues, case management would be a more appropriate course of action to link newly diagnosed HIV-infected individuals to care as opposed to passive referral. So far, there has only been one randomized trial of a case-management linkage-to-care intervention to date, and its specific effects on MSM were not assessed (63, 64). It is recommended that a randomized control trial (RCT) take place to study the effects of case-management on newly diagnosed MSM experiencing depressive symptoms. These participants should be randomly assigned to the case-management intervention or passive referral method. Results of the study would aid in modifying or developing new interventions.

MANAGE DEPRESSIVE SYMPTOMS THROUGH RESILIENCE PROMOTION AMONG MSM RETAINED IN CARE

Resilience is self-evident in gay and bisexual men’s life histories. For example, gay and bisexual men display an incredible amount of resilience after coming out in order to overcome feelings of isolation, stigmatization, and rejection. Furthermore, resiliency is needed to help gay and bisexual men deal with homophobia, marriage inequality, and discrimination. In the context of HIV, resilience is even more critical as the disease has historically and continues to afflict the MSM population. Our findings suggest that resilience is a multidimensional construct and that different patterns of resilience exist among MSM. In this study, resilience scores were higher among MSM asymptomatic of depression, regardless of retention. However, when comparing resiliency mean scores by retention in care stratified by depression, we observed that resiliency may be protective of depression among MSM retained in care. Given the small sample size in this sub-analysis, these results should be interpreted with caution. Although this study did not seek out how to address mental health, this observation suggests that designing public health interventions aimed at building resilience for HIV-positive MSM in care could mitigate depressive symptoms. However, according to our results, interventions like these will need to be cautious to not over build resilience among MSM under age 40. This observation corroborates a pilot study in rural China which found that resilience building interventions among HIV-positive individuals increased their levels of resilience, social support, and decreased levels of depression and anxiety (65).

RESEARCH RESILIENCE AMONG MSM DEPRESSED AND NOT RETAINED IN HIV CARE

MSM with depressive symptoms had higher resilience scores among those retained in care compared to those not retained in care. Although this finding was not significant, one explanation for this observation could be that these men are more self-reliant on managing their own health. For example, the resilience scale included items like “I usually manage one way or another” and “My belief in myself gets me through hard times”. Additionally, if these men aren’t engaged in sustained HIV care, they may also not be managing their mental health. Higher levels of resilience among MSM with depressive symptoms may be a proxy for self-denial or a cognitive disconnect between one’s mental health state and medical care. Future studies on resilience and retention among MSM should involve a mixed-methods approach that includes quantitative data on resilience levels and qualitative data from interviews and focus groups. Focus groups should be split between HIV-positive MSM with depressive symptoms retained and not retained in care. If future studies also find higher resilience levels for MSM who are depressed and not retained in care, qualitative data would help elucidate this relationship.

RESEARCH HOW DEPRESSION SHAPES RETENTION IN HIV CARE BY AGE

Participants aged 18-29 in this sample who were not retained in care had a higher percentage of reported depression compared to all other age groups. A previous study found that depression was associated with poorer ART adherence among HIV-positive patients. However, patients who were also depressed *and* taking anti-depressants had a viral load similar to other non-depressed patients—most likely a result from increased ART adherence. Therefore, future research should examine how treating depression among HIV-positive MSM ages 18-29 would impact retention in HIV-care. Furthermore, research is also needed to explore whether the prevalence of depression is higher among those retained in care among MSM ages 30-49 compared to those not retained in care. There are several hypotheses that could be generated about this observation, such as the progression of AIDS as one gets older could lead to greater feelings of depression while simultaneously necessitating the need for HIV care. The lack of quantitative and qualitative data for this observation poses challenges to explaining this trend.

EXAMINE THE ROLE OF RESILIENCY IN MSM UNDER AGE 40

We found that among participants aged 18-39, higher levels of resilience was associated with poorer retention in HIV care. Similar to MSM with depressive symptoms who were not retained in care, MSM under the age of forty may downplay the need for HIV care due to strong feelings of will-power and self-determination. These men are perhaps more likely to rely on support from themselves or from social networks as opposed to medical care for managing their HIV. Another explanation for this trend could be the result of a cohort effect. MSM under age 40 did not live in an era where HIV/AIDS ravaged the gay community. With the advent of lifesaving drugs, younger HIV-positive MSM who are resilient may feel as though they can adequately cope or overcome the disease. Future studies should examine how resilience influences health seeking behaviors and HIV care engagement. Qualitative data could illuminate the relationship between resilience and retention and guide public health interventions for MSM in this age group.

HELP MSM SEEK SUPPORT FROM SOCIAL NETWORK MEMBERS

Many studies have found an association between social support and HIV care engagement. Similarly, research has also linked resilience with social support among HIV-infected individuals. This study found that participants who sought HIV specific support from social network members were more likely to be retained in care. It is recommended that public health interventions specifically help MSM develop strategies to seek out support from social networks. These interventions could be a part or an extension of resilience interventions proposed above.

STANDARDIZE PSYCHOSOCIAL AND CARE ENGAGEMENT MEASURES

In order to fully assess how psychosocial barriers shape linkage to and retention in HIV care, standardized measurements and validated scales are needed to draw comparisons between different studies. Multiple definitions exist for linkage to care and at least six different measurements for retention appear in the current body of literature. The lack of consistency in psychosocial measurements also poses challenges to the public health community when doing a meta-analysis of HIV care engagement. For example, while the CES-D measure appears to be the commonly used depression measure, many studies still use the Beck's depression inventory scale. Furthermore, our internal HIV stigma measure draws from the frequently used Berger's stigma scale, but no common scales exist for externalized HIV and MSM stigma. Our study used the neighborhood perceptions of HIV scale for externalized stigma and adapted it for MSM stigma. Unfortunately, both of these scales had very low internal reliability coefficients and thus were not factored into our analysis. Previous studies have found associations between retention in HIV care and externalized HIV and MSM stigma. If there was a uniform externalized HIV and MSM stigma measure, our study could have corroborated or contradicted prior research

CONCLUSION

Overall, this study elucidates the relationship between key psychosocial factors and HIV care engagement among MSM. Interventions designed to address or treat depressive symptoms after receiving an HIV diagnosis could lead to successful linkage to care. Further research is needed to assess how addressing or treating depression would positively affect retention, particularly among HIV-positive MSM under age 30. Moreover, it is recommended that future research focus on the role of resiliency on age and depression for sustained retention in care. Specifically, resiliency campaigns for HIV-positive MSM may need to be messaged with proper HIV care seeking behaviors, particularly for men under age forty. Resiliency interventions should also be coupled with strategies to help HIV-positive MSM seek support from social network members. Our findings demonstrate that tailored interventions are needed to address the different psychosocial barriers affecting linkage to and retention in HIV care.

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APPENDIX

APPENDIX A: ANDRESEN SHORT-FORM (CESD-10) OF THE CENTER FOR EPIDEMIOLOGIC STUDIES DEPRESSION (CES-D) SCALE

Please choose the answer that best fits to how you felt and behaved during the past week on a scale of 0 to 3.

0= Rarely or none of the time (less than 1 day a week)
1= Some or little of the time (1 to 2 days a week)
2= Occasionally or moderate amount of the time (3 to 4 days a week)
3= Most or all of the time (5 to 7 days a week)

I was bothered by things that usually don't bother me.

I had trouble keeping my mind on what I was doing.

I felt depressed.

I felt that everything I did was an effort.

I felt hopeful about the future.[a]

I felt fearful.

My sleep was restless.

I was happy.[a]

I felt lonely.

I could not get "going."

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[a] Indicates positive item.

APPENDIX B: SUBSCALE OF THE BERGER HIV STIGMA SCALSE

Please indicate the extent to which you agree with the following statements on a scale of 0 to 4.

0=Strongly disagree
1=Disagree
2=Neutral
3=Agree
4=Strongly agree

It is difficult to tell people about my HIV infection.

Being HIV positive makes me feel dirty.

I feel guilty that I am HIV positive.

I am ashamed that I am HIV positive.

I sometimes feel worthless because I am HIV positive.

I hide my HIV status from others.

APPENDIX C: PERCEIVED NEGATIVE HEALTH SCALE

Please indicate below how you feel today on a scale of 0 to 4, compared to how you felt before you had HIV.

0=Feeling much worse
2=Feeling the same
4=Feeling much better

How you feel physically, overall

Degree of physical pain you feel daily

Degree to which you feel limited physically

How you feel emotionally

How happy you feel, overall

How much energy you feel, overall

Degree to which you can take care of household chores

APPENDIX D: HIV-SPECIFIC SOCIAL SUPPORT SCALE

Thinking about the people you have disclosed your HIV status to, do you feel like…

0=No
1=Yes

You have someone you can talk to when you're feeling sad about your HIV status?

You can get a ride from a family member or friend to go to HIV care appointments?

You can count on someone to take care of you when you feel sick?

You know people who can help you with household chores when you cannot do them?

You know people who defend you when others talk negatively about your HIV?

APPENDIX E: SUBSCALE OF THE WAGNILD AND YOUNG 14-ITEM RESILIENCE SCALE (RS)

Please check the box indicating how much you disagree or agree with each statement.

0=Strongly disagree
1=Disagree
2=Neutral
3=Agree
4=Strongly agree

I usually manage one way or another

I feel proud that I have accomplished things in my life

I usually take things in stride

I am friends with myself

I am determined

I keep interested in things

My belief in myself gets me through hard times

My life has meaning

When I am in a difficult situation, I can usually find my way out of it

I have enough energy to do what I have to do