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**COMPARISON OF SOCIAL NETWORKS, PERCEIVED RISK AND
HIV RISK BEHAVIORS BETWEEN OLDER AND YOUNGER
AFRICAN AMERICANS LIVING IN HIGH PREVALENCE
ZIP CODES OF ATLANTA, GEORGIA**

By

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Georgia State University

A Thesis submitted to the Graduate Faculty of
Georgia State University in Partial Fulfillment
Of the Requirements of the Degree

MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA

30303

**COMPARISON OF SOCIAL NETWORKS, PERCEIVED RISK AND
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ZIP CODES OF ATLANTA, GEORGIA**

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ABSTRACT

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**COMPARISON OF SOCIAL NETWORKS, PERCEIVED RISK AND HIV RISK
BEHAVIORS BETWEEN OLDER AND YOUNGER AFRICAN AMERICANS
LIVING IN HIGH PREVALENCE ZIP CODES OF ATLANTA, GEORGIA**

(Under the direction of Laura Salazar, Ph.D)

The prevalence of HIV/AIDS in the United States is still high despite advances in prevention and therapies. Among all races and ethnic groups, African Americans are the most severely affected and face a disproportionate burden. African Americans account for a higher proportion of HIV infections and deaths than other races and ethnicities. In addition, one of the fastest growing segments of AIDS cases is patients more than 50 years of age. This segment receives little attention concerning HIV infection and as the U.S. population continues to age, it is important to be aware of specific HIV-related risks faced by these older African Americans and to ensure that they get information and services to help protect them from infection. This study aims to understand and compare the social network characteristics, perceived risk of getting HIV infection and HIV risk behaviors between younger (18 to 49 years of age) and older (50 plus years of age) African Americans living in high HIV prevalence zip codes of Atlanta, Georgia. The study population included 897 African Americans. Controlling for socio-demographic variables, multivariate analyses revealed that older African Americans have significant higher proportion of injection drug use, are less likely to get tested for HIV and more likely to have a risky sex partner

(i.e., exchange sex for money or drugs); however, older African Americans were less likely to engage in sexual risk behaviors. Groups did not differ in terms of their perceived risk for HIV and social network characteristics. More research is necessary to understand their HIV-related risk behaviors, both sexual and drug use, and the specific needs for primary prevention effort of HIV/AIDS transmission among older African Americans.

Key Words: HIV/AIDS, social network, perceived risk, HIV risk behavior, younger, older, African Americans

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CHAPTER I

INTRODUCTION

Epidemiology of HIV infections has markedly changed over the past decades. The AIDS epidemic is still in the United States although HIV is no longer inevitably fatal. In the United States, about 1.1 million Americans are living with HIV infection and 21% of them are unaware of the infection according to Centers for Disease Control and Prevention (CDC, 2011). Among all races and ethnic groups, African Americans are the most severely affected group and face the biggest burden of HIV. According to Centers for Disease Control and Prevention (2012), African Americans constitute 44% of all new HIV infections although they represent only 14% of the US population in 2009. African Americans account for a higher proportion of HIV infections from new infections to deaths than other races and ethnicities. In 2009, black men who have sex with men (MSM) represented an estimated 37% among all MSM, and 73% of new infections among all black men. Among African Americans, youth group is severely affected by HIV infection, representing half of all new HIV infections among young people aged 13 to 29. Among young black females aged 13 to 29, the rate of new infections is 11 times as high as that of young white females. AIDS is the third leading cause of death among black women aged 25 to 34 and black men aged 35 to 44, many of whom become infected at a younger age (CDC, 2012).

Due to the increased prevalence of people living with HIV in African Americans communities, they have more chance to have sex with the partners of the same ethnicity and also face a higher risk of HIV infection with each new sexual partner. Additionally,

African Americans are less likely to be aware of their HIV status. The rate of undiagnosed HIV infection among blacks was nine times that among whites (Centers for Disease Control and Prevention, 2012). Furthermore, the stigma associated with HIV and homosexuality may facilitate transmission of HIV in African American communities. Due to the fear of disclosing risk behavior or sexual orientation, it may prevent them from taking an HIV test, treatment and support from friends and family. Finally, it creates the lack of important information about prevention of HIV infection in African American communities. Regarding socio-economic conditions, African Americans live with higher levels of poverty, racial discrimination, lack of access to healthcare, higher rates of incarceration, which disrupt social networks, and contribute to heightened HIV risk (Centers for Disease Control and Prevention, 2012). Moreover, people with HIV disease are also living longer and the result is an HIV population that is both growing and graying. It is important to note that the CDC uses the term “older adult” to define those over the age of 50. Therefore, for the purpose of this paper, the standard convention of “older” with HIV is considered 50 and older (Mavandadi et. al., 2009).

In the United States, the 65 and older population increases, accounting for 40.3 million, approximately 13% of the population according to the U.S Census Bureau (2010). By 2050, their number is projected to more than double to 89 million. In 2011, Baby Boomers began reaching age 65, the 65 and older population in the United States will increase from 13 to 20.2 percent in 2050, and about one in five persons in 2050 will be aged 65 or older (Shretha & Heisler, 2009). Due to the significant increase in numbers and proportions, increased life expectancies, and active life styles, older people now live actively and are also sexually active. At the beginning of the AIDS epidemic, HIV-

infected persons were not able to live into old age. HIV prevention for people over 50 is an important health concern because of the growing number of the older U.S. population. In 1996, older adults made up 10% of individuals diagnosed with HIV/AIDS. According to the CDC 2003 and 2004, this group represents 11.4% of individuals diagnosed with HIV/AIDS. By 2015, CDC estimates that at least half of people living with HIV infection will be 50 years of age or older. This demographic shift is due to not only the improved life expectancy with extensive accessibility and affordability of highly active antiretroviral therapy (HAART) (Brennan, M. et al., 2009), but also to the increased number of newly infected HIV among this group (15% of annual cases). Although HIV is treatable and manageable, the disease is chronic and incurable. Additionally, the rates of HIV/AIDS among adults older than 50 were 12 times as high among African Americans compared with whites. Although the prevalence of HIV/AIDS among older adults is rapidly increasing, little is known about the risky sexual behaviors of this group (Illa L. et al., 2008). Some Americans incorrectly consider that older adults are not sexually active. As a result, doctors fail to discuss sexuality with their older patients (Kuehn, 2008). In 2011, findings from a national survey conducted by the National Advisory Council on Aging to study sexual activity among persons over 60 years showed that more than 92% of the respondents regarded sex as an important part of their life. It is important to be aware of specific challenges faced by older adults especially African Americans.

To age successfully and healthy, older people will need social support in their networks. According to Neblet et al., (2011), social networks are a powerful source of influence on a number of HIV/STI risk behaviors such as drug use and multiple sexual partnerships. Individuals with strong supportive relationships are more likely to be

socially engaged, psychologically healthy, and happier in life, which may enhance motivation to engage in protective behaviors including HIV testing and safer sex. In addition, in the context of HIV/AIDS, in order to encourage protective behavior, older people should perceive that HIV/AIDS is a serious disease and that they are susceptible to acquiring the virus. The study conducted by Jackson and colleague (2005) identified that although older adults have relatively high levels of HIV/AIDS knowledge, many older African Americans still believe that HIV can be transmitted through casual contact and also have other misinformation regarding transmission. Older African Americans believe that HIV/AIDS is a serious disease but do not feel personally susceptible to acquiring it. This low perceived risk may lead to a resistance to use condoms among both older African American men and women. As the US population continues to age, it is important to be aware of specific challenges faced by older African Americans and to ensure that they get information and services to help protect them from infection.

HIV Epidemic in Southern United States

HIV and AIDS epidemic is not evenly distributed across states and regions of the United States. The southeastern States is more affected by HIV/AIDS than any other regions in the country. At the end of 2010, the South accounted for 45% of the estimated new AIDS diagnoses in the 50 states and the District of Columbia (CDC, 2012). The issues facing the Southern region of the United States are most obvious in the state of Georgia (Hana et. al., 2012). According to the Georgia Department of Public Health (2011), HIV/AIDS remains an important public health problem in Georgia which is the sixth highest rate in the nation for its cumulative reported AIDS cases through December 2009. African Americans accounted for 77% of HIV/AIDS cases diagnosed in 2010, and

they make up only 31% of Georgia's population. In general, HIV and AIDS are concentrated in urban areas. Sixty-six percent of people living with HIV/AIDS resided in the Atlanta Metropolitan Statistic Area (MSA) in 2010. The Atlanta MSA comprised more than 50% of the state population in 2010 and had the greatest percentage of people living with HIV/AIDS in the state (66%). African Americans represent seventy-four percent of new HIV/AIDS diagnoses. In Georgia, the HIV/AIDS epidemic is primarily driven by sexual contact, particularly among men who have sex with men and high risk heterosexuals. Injection drug use is also a high risk group, but less prevalent than sexual exposure.

A number of studies have examined HIV/AIDS knowledge among older adults. However, few studies have focused exclusively on African American elders (Jackson, Early, Schim & Penprase, 2005). The present study will focus on understanding the epidemiology of the risk behaviors of older African Americans compared with younger ones in terms of social support, perceived seriousness and susceptibility, and risky behavior. Before analyzing the research question, the current literature on HIV/AIDS in older adults, HIV risk behaviors in African Americans, social support and HIV risk behaviors, perceived risk and HIV risk behaviors, and HIV/AIDS in Southern area of United States was thoroughly examined. Data from Geography Projected conducted by Dr. Rothenberg and colleagues was used to perform statistical analyses of comparisons of the social networks, perceived risk and HIV risk behaviors between older and younger African Americans living in Atlanta, Georgia with high prevalence.

Purpose of the Study

The present study compares the social network characteristics, perceived risk and HIV risk behaviors between older and younger African Americans living in high HIV prevalence zip codes of Atlanta, Georgia. By comparing the high risk behaviors between older and younger age groups, we can better understand the specific needs of each group, and create the designs for the effective and efficient HIV/AIDS preventive measures in the specific group.

Base on the available literature and data available, the following affirmative hypothesis was proposed: “Older African Americans have less small social support, perceived risk and HIV risk behaviors than younger African American in high HIV prevalence zip codes of Atlanta, Georgia.”

The corresponding null hypothesis was: “There will be no difference in social support, perceived risk and HIV risk behaviors between older and younger African Americans living in high HIV prevalence zip codes of Atlanta, Georgia.”

CHAPTER II

LITERATURE REVIEW

The purpose of the study is to compare the social network characteristics, perceived risk of getting HIV infection and HIV risk behaviors between older and younger African Americans living in high HIV prevalence zip codes of Atlanta, Georgia. The following is an overview of the social support, perceived risk and HIV risk behaviors that are relevant to the study.

2.1 HIV/AIDS in older people

Risk associated with human immunodeficiency virus (HIV) continues among Americans. At the end of 2008 in the United States, nearly 1.2 million Americans are living with HIV/AIDS (CDC, 2012). According to the Centers for Disease Control and Prevention, approximately 19 million new cases of human immunodeficiency virus (HIV) infection occur annually in the United States (CDC, 2006). One of the fastest growing segments of AIDS cases is patients aged more than 50 years (Wutoh et al., 2011) that receives little attention concerning HIV infection (Oberne, 2009). If little attention is paid to older adults, this number will continue to increase. HIV/AIDS has become a significant national problem among older adults (Maes & C Louis, 2003). By the end of 2006, it is estimated that more than 21% of individuals living with AIDS were aged older than 50 years (Wutoh et al., 2011). Additionally, for 2006, individuals aged more than 50 years represented more than 40% of all AIDS deaths (Oberne, 2009). By 2015, CDC

(2003) estimates that at least half of people living with HIV infection will be 50 years of age or older. This trend is particularly alarming in certain urban areas.

Despite the aging of the population, little is known about the sexual behaviors and sexual activities of older adults (Ilia et al., 2010). Sexual contact is the most common HIV transmission route among older adults (Chiao, Ries, & Sande, 1999) and it confirms the presence of both sexual activity and sexual risk behaviors among this population. According to the national surveys (National Bulletin of the National Advisory Council on Aging, 2002) examined the sexual activity among older people over the age of 60 and the study showed that more than 92% of the respondents regards sex as an important part of their life and that 75% of older adults age between 65 and 74 are sexually active. Studies found that even though sexual activity may decrease with increasing age, older adults remain sexually active and many of them may engage in high risk behaviors (Linley et al., 2012). A recent study indicated that 83.7% of men and 61.6% of women aged 57 to 64 years, and 67.0% of men and 39.5% of women aged 65 to 74 years, reported sexual activity with a partner during the previous 12 months (Linley et al., 2012). In another sample of adults aged 50 years and older, 81.5% were involved in one or more sexual relationships, some including high-risk activity such as unprotected sex with commercial sex workers (Linley et al., 2012). After age 50 years, some men who have sex with men also continue to engage in risky sexual activity. A probability sample of urban men who have sex with men found that among those aged 60 to 69 years, more than 50% reported having had 2 or more sex partners during the previous year, 25% reported 9 or more partners, and 15% reported 15 or more partners. Emerging data suggest that sexually active older adults are engaging in risky sexual behaviors although little is known about

the sexual behaviors of older HIV-positive adults (Ilia et al., 2008). This finding is consistent with other studies that report continued increased rates of unprotected intercourse among people with HIV, approximating 33% (Kalichman et al., 2001). Earlier research by Wutoh and colleagues reported that close to 50% of older AIDS patients in neighboring Maryland were infected through sexual intercourse.

Additionally, older adults are unlikely to notice risk factors associated with HIV because physicians infrequently take complete sexual risk behavioral histories from their older patients. For example, one important high risk behavioral among older adults is the lack of condom use during sexual intercourse (Oberne, 2009). Furthermore, incorrect assumptions, such as AIDS in older patients is a result of tainted blood transfusions, have resulted in a shortage of HIV prevention efforts in older populations (Wutoh et al., 2011). Among older adults, protected sexual intercourse did not practice during most recent intercourse with 91.5% of casual partners, 76.0% of friends, 69.6% of new contacts, and 33.3% of transactional sexual partners (2008 National Survey of Sexual Health and Behavior). A survey of adults aged 50 years and older found that 92% had never used condoms and that 95% had never been tested for HIV infection. Older sexually active HIV-infected individuals may also be more resistant to behavioral changes that reduce their high risk behaviors (Maes & Louis, 2003). Wutoh et al. (2005) found reluctance to use condoms among HIV positive older adults despite their acknowledgment of HIV's seriousness. One study reported that the risk behaviors of older adults were similar to younger counterparts (Stall and Catania, 1994). However, older adults were one sixth as likely to use condoms and one-fifth as likely to seek testing in comparison to people in their twenties (Sankar et al., 2011). Although risk reduction interventions adapted for the

special needs of people living with HIV/AIDS have begun to demonstrate promising results, focus on HIV positive older adults is needed (Gordon, Forsyth, Stall, &c Cheever, 2005; Kalichman et al., 2001).

There is limited information on sexual behavior among older adults and how sexual activities change with aging and illness (Linday et. al., 2007). The National Social Life, Health, and Aging Project (NSHAP) was designed to provide data on the sexual activity, behaviors, and problems of older adults. In studies comparing older and younger adults, older adults reported being ashamed of their illness, and felt others were uncomfortable around them (Emlet, 2006a). Feelings of shame, guilt, and depression lead to a decrease in self-esteem and decline of social interactions (Emlet, 2007; Fife & Wright, 2000; Galvan, Davis, Banks, & Bing, 2008). Bhavan and colleagues (2008) described that although many older HIV-infected persons live with longstanding HIV infection as a testament to the success of antiretroviral therapy (ART), an increasing number of older adults are becoming infected through unprotected sex or intravenous drug use. There is little education for older adults regarding safe behavioral practices. Condom use is lower in both older male and female adults because erectile dysfunction may complicate condom use in men, and postmenopausal women are no longer concerned with pregnancy. It is clear that there are continuing risks taking behaviors among the most senior members of our population.

Older adults often have knowledge deficits on these topics and the assessment of risk behavior (including intravenous drug use) is particularly important. Older adults may also engage in drug-related HIV risk behaviors according to the 2008 National Survey of Sexual Health and Behavior. A survey assessing the risk behaviors of older and younger

injection drug users and crack smokers indicated that although drug users aged 50 years and older shared needles less frequently than did younger drug users, sexually active older drug users were as likely as younger drug users to report sex-related risk behaviors. Older persons may not be adequately aware of the possible risks of HIV infection. Older women felt that their substance use and sexual behavior was age inappropriate. In contrast, older men did not feel their drug use and sexual behavior was age inappropriate. These findings may be useful and important for the development of HIV prevention and control programs. Furthermore, uninfected older adults had little interest in learning about HIV (Altschuler et al., 2004; Mack & Bland, 1999; Wright, Drost, Caserta, & Lund, 1998) and did not perceive themselves at risk (Maes & Louis, 2003).

Many physicians and other health professionals, including health educators fail to screen the older population for HIV thoroughly because they are uncomfortable to discuss sexual histories with older adults (Oberne, 2009). Conversely, care providers are generally weak in routinely collecting sexual histories of their older patients aged 50 years or older, possibly because they perceive older adult to be at low risk, or because a older person is the age of their parents or grandparents and they are personally uncomfortable to discuss sexual activity with them (Oberne, 2009). Additionally, only a minority of 50 years and older aged patients report that they have discussed sexual activity with their care providers. Siegel, Schrimshaw, and Dean (1999a, b) found that older individuals sometimes confuse the symptoms of aging with HIV, leading to a delay in testing.

In summary, although the studies reviewed found older and younger adults engaged in similar HIV risk behaviors, older adults did not perceive themselves to be at

risk and were reluctant to take preventive measures even after an HIV diagnosis. For the older population, efforts to target high-risk sexual behaviors may be more important because of socio-cultural, biological, and behavioral vulnerabilities.

2.2 HIV risk behaviors in African Americans

African Americans populations in the United States are disproportionately affected by HIV (Coleman & Katherine, 2010). African Americans have a higher incidence rate, prevalence, and mortality rates for HIV infections than those of any other group, regardless of age, gender, or socioeconomic status (CDC, 2007) and the National Center for Health Statistics (2002). Although widespread campaigns educate the public about the disease, incidence rates of HIV infection among African Americans continue to rise steadily (CDC, 2007; Stone, 2004). Studies reported that the incidence rate of AIDS diagnosis among African Americans was almost 11 times greater than the rate among Whites (CDC, 2007). Noticeably, heterosexual transmission has become the dominant mode of transmission for HIV infection.

Among U.S. males, African Americans men account for 63% of HIV transmissions through high-risk heterosexual exposure compared to 13% whites and 21% Hispanics. Among African American females, nearly half of the recent HIV cases (44%) are attributed to high-risk heterosexual transmission. Among African Americans, one important factor is machismo which is an ideology present that emphasizes perpetual male dominance over females and characterized by an overemphasis in male sexual ability. Alternatively, as a traditional role, it emphasizes the importance of men as heads of families and related responsibilities to protect their partner and family. Depending on

male dominance or responsibility, machismo may be a risk factor as well as a protective factor (Henny et al., 2012). Sexual network patterns among African Americans were characterized by concurrency and mixing among different subpopulations. Concurrent sexual partnerships can spread sexually transmitted diseases including HIV infection faster than the same rate of new and sequential partnerships through heterosexual contact. In U.S, the prevalence of concurrent partnerships is higher among blacks than whites. Another major contributing factor among African Americans is lower marriage rates and incarceration is also associated with concurrency. Among African Americans, the extent of concurrency possibly contributes significantly to transmission of HIV infection (Adimora et al., 2009).

Among young men who have sex with men (YMSM) aged 25 and younger, the rate of HIV infection have steadily increased since 2001. It represents over 20% of new HIV diagnoses (CDC, 2009). Among MSM in New York City, overall rates of having ever tested for HIV and testing for HIV in the last year are high and have been increasing. However, they found a large proportion (60%) of older MSM reported not getting tested in the 2 years before their HIV diagnosis. They found that partners of young MSM tended to be older than the young MSM. For young MSM, having sex partners with higher HIV prevalence (older partners) may be contributing to the rising HIV prevalence among this group. For example, some YMSM may prefer older MSM as sex partners. Among MSM group, African American men who have sex with men (MSM) represented an estimated 37% among all MSM, and 73% of new infections among all African American men in 2009. Among young men who have sex with men (YMSM) aged 25 and younger, the rate of HIV infection have steadily increased since 2001. It represents over 20% of new HIV

diagnoses (CDC, 2009). A better understanding of the HIV risk behaviors in African Americans is needed.

Among U.S women, according to the Harawa et al., (2012), high-risk heterosexual contact (such as sex with an injection drug user, man who has sex with other men or an HIV positive man of unknown risk) has been identified as the leading mode of HIV transmission. At the end of 2009, CDC estimated that 76% of Black women, 71% of Hispanic women, and 65% of white women living with HIV in the United States acquired HIV infection through sexual contact with a high-risk male. Because of the high proportion of infections in females through heterosexual exposure, the number of men who have sex with both men and women (MSMW) is of increasing interest and concern. In another study between 2003 and 2005 with 10,030 MSM, 28% of African American and 17% of Hispanic MSM reported oral, vaginal, or anal sex with both men and women compared to 8% of their White counterparts reported in the last 12 months (Harawa et al., 2012). Furthermore, nearly 50% of each racial/ethnic group reported unprotected vaginal or anal sexual intercourse with their female partners (Harawa et al., 2012). In another study conducted with young non-gay-identifying African American MSMW, respondents reported less frequent use of condoms with their female than male partners. Finally, in 2007, a study of 456 HIV-positive MSM found increased transmission risk factors in African American MSM relative to other MSM. These findings suggest that African American women with MSMW partners have high rates of risky behaviors, and are more likely to engage in the risky behaviors than other women. Many women may not be aware of a male partner's same-sex activity. Efforts to reach female partners of bisexual men might be effective (Harawa et al., 2012).

Additionally, poverty, incarceration, and disparities in health care have been associated with the risk of HIV infection. African Americans are disproportionately affected by poverty which has been correlated with disparity in health care compared with whites. Because of the majority of sex partner networks are intra-racial, interventions designed to reduce risky sexual behaviors among heterosexual African American men have great potential to substantially reduce transmission in the whole African American community. As a result, the more holistic health promotion approach including HIV prevention may be more effective way of reducing HIV sexual risk behavior among these African American men (Henny et al., 2012). Furthermore, Americans aged 50 years and older currently experience a prevalence rate ranging from 10% to 15% of all HIV cases in the United States, but prevention campaigns rarely target this population (Siegel, Schrimshaw, & Vittinghoff, 2004; Wutoh et al., 2001). Older African American males in particular are at increasing risk of HIV infection.

To understand more about the factors associated to the risky behaviors of HIV infection in older adults, the study focuses to compare the HIV risk behaviors between younger and older African Americans.

2.3 Social Support

Social networks are a powerful source of influence on a number of HIV/STI high risk behaviors including drug use and sexual partnerships. Social network members may be sex or drug partners, friends or family, neighbors, or coworkers. Social norms have a strong sense of influence on various health behaviors and social networks have a long-standing recognition of the role in transmission of HIV and other infectious

diseases. Social support, one aspect of a social network, has been theorized to serve as a protective factor against negative health behaviors. For example, Naar-King et al. (2006) found that social support for safer sex was associated with condom use among HIV-positive youth. Yet, researchers have failed to find a significant relationship between general social support and risky sexual behaviors among HIV negative and HIV-positive adults (Crepaz & Marks, 2002) and young HIV-positive and HIV-negative men (Hays et al., 1997; Hein et al., 1995; Stein et al., 2005). More research is needed to clarify the role that social support specific to safer sex plays specific rates of unprotected sex (Cohen, 1988).

During the first two decades of the HIV/AIDS epidemic, the primary purpose of research and treatment was to keep people alive and healthy. In the third decade, people with HIV disease living longer and active; thus, a shift that focuses on the quality of life of HIV-infected people especially older adults occurred. To age successfully and healthy, older HIV-positive adults will need long-term caregivers in their social networks who will provide assistance with various activities to providing emotional and financial assistance. Many older people delay to disclosing their HIV serostatus to family and friends because of the HIV/AIDS related stigma. Failure to disclose creates barriers to communication which can contribute to the lack of social support from people. HIV-infected older adults are not willing to ask for help because they do not want to disclose the reason why they need assistance. Further, most of these older adults rely on friends who are also HIV positive who need the same types of support (Shippy & Karpiak, 2004). However, life events such as retirement, illness, relocation and death of family and

loved ones can result in narrowing social networks among older adults (Baltes & Baltes, 1990).

For older adults, social support becomes an increasingly critical resource and the critical aspect is not only the size but also the functionality of the support (Cantor, M. H. et al., 2009). There are a few studies that have examined various elements of social support among middle or older adults living with HIV/AIDS. Cowdery and Pesa's (2002) study found that increased age is significantly associated with lower levels of social functioning. Schrimshaw and Siegel (2003) studied adults, age 50 years and older, living with HIV/AIDS and in this study, 42% of their respondents felt their emotional support was insufficient to meet their needs. The unavailability of family and the deaths of friends are reasons for insufficient support (Emlet, 2006). Smaller social networks are more likely to be associated with poor health and well-being, especially for people as they age and negotiate the transition of their life. Heckman and colleagues (2000) found that African American men received significantly more support from immediate family members than their white counterparts but were less likely to disclose their HIV status to friends (Emlet, 2006). Brown and Sankar (1998) have suggested that despite historically greater support from family, older African Americans with HIV may face discrimination from family, friends, and religious institutions because of the HIV related socially stigmatized behaviors. In the study of older African Americans, Jimenez (2003) found that having HIV/AIDS was very high rate of stigmatizing.

Regarding to drug injector social networks, social support has been associated both negatively and positively with needle sharing. One study found that encouragement among drug user network members to clean needles was associated with decreased

needle sharing (Frey et al., 1995). Other studies have shown that social support is a risk factor for unsafe needle sharing behaviors (Suh et al., 1997). Among intravenous drug user, needle sharing is a sign of trust. Needle sharing may be an act of understanding and close social relationship among injectors (Johnson & Williams, 1993). Studies indicate that injection drug users are more likely to share needles with those with whom they are closest, (i.e., friends or sexual partners) (Friedman, Curtis, Neaigus, Jose, & DesJarlais, 1999; Valente & Vlahov, 2001). Injectors may engage in risky needle use behavior with people because they may fear losing a valued, supportive relationship if they do not engage in such behaviors. Among intravenous drug users (IDUs), social network characteristics have been found to be correlated with HIV-related high-risk sexual behaviors (Neblet et al., 2011). However, it is also important to note that supportive relationship to non-injectors may have a protective effect on injectors' needle use risk behaviors (Neaigus et al., 1994). This finding suggests that certain relationships with non-injectors may protect against engagement in needle sharing risk behaviors.

It is important to consider the disproportionate impact of HIV/AIDS on communities of color and also critical for social workers and others working in HIV/AIDS to consider the potential vulnerability of older African Americans for HIV education, counseling and service delivery. Findings in a study suggested that both aging and HIV are closely related to social work practice and that social workers should be prepared to provide appropriate services to older clients (Emlet and Poindexter, 2004). Training to health care providers is needed to increase awareness of sexuality issues and risk behaviors among older adults (Brennan, M. et al., 2009). At the beginning, social workers must need to personally fight against ageist, homophobic, or HIV-stigmatizing

belief in themselves, their colleagues, and the general public that could emphasize myths about aging, sexuality, and HIV/AIDS. Typically, partners and family members are key sources of informal support, but only one third of respondents had a partner and 71% lived alone. If the informal care giving provided by family, friends, and neighbors were replaced by formal (i.e., paid) caregivers, the cost would exceed \$257 billion annually (Arno, 2002, cited in National Alliance for Care giving and AARP, 2004). The results of this study suggest that social support and networks may be an important target for intervention.

Learning more about social network characteristics and their association with risky sexual practices can assist in the development of HIV prevention programs that target both the individual and their network members (Neblet et al., 2011).

2.4 Perceived Risk

Based on the Health Belief Model, the goal of HIV education and prevention is to increase knowledge and perception of susceptibility in order to increase safer behaviors (Cole, Logan & Shannon, 2008). The following is the summary review of different studies on relationship of perceived risk and HIV risk taking behaviors.

According to the National Center for Health Statistics National Health Interview Survey, Rodgers-Farmer (1999) found that a large number of respondents believed that people who didn't look sick were not infected and 98% of them perceived that their chances of acquiring HIV infection were low. The greatest obstacle to HIV prevention with this population is resistance to condom use. Depending on the rate of HIV prevalence in the community, the individual living in high prevalence HIV rate are at

higher risk of HIV infection than are people living in communities with lower prevalence rates (Kalichman & Cain, 2005). Kalichman & Cain (2005) reported that individuals who perceived that their communities have lower HIV prevalence rates compared with other communities engaged in more sexual risk behaviors than did individuals who perceived their community to have higher HIV prevalence rates.

Generally, older African Americans had high levels of HIV knowledge but did not believe that they were personally susceptible to acquiring HIV. They believed that HIV can be acquired through casual contact such as kissing and had other misconceptions regarding HIV transmission (Jackson, et al., 2005). Besides, older adults are engaging in the risky behaviors because they perceive themselves to be low risk for HIV infection and less likely to adopt safer sexual behaviors (Goodroad, 2003). Although older African American men and women perceived HIV/AIDS to be a serious disease, they were reluctant to use condoms (Jackson, et al., 2005). In the study conducted by Stall and Catania (1994), they document that the rate of reported condom use among middle-aged and older sexually active persons who engaged in risky behaviors was lower than the rate of condom use in younger persons. There is little education for older adults regarding safe behavioral practices (Bhavan and colleagues, 2008). The lack of perceived risk among older adults was due to the various factors, including social stereotypes about elder sexuality, limited information for older adults about HIV infection and a lack of general HIV knowledge (Lekas et al. 2005). Older African American men, both heterosexual and MSM, engage in considerable risky sexual behavior, including having unprotected sexual intercourse with multiple partners as well as unprotected sex with commercial sex workers. Some are also long time street drug users. An additional study

of primary care physicians showed that health care providers were less likely to counsel for HIV testing in the older adult over 50 year age group, and less likely to discuss symptoms suggestive of HIV infection (Lekas et al. 2005). Consequently, HIV testing is infrequently offered in older adults because of the lack of perceived risk African-American men (Coleman & Ball, 2007). Furthermore, middle-aged and older adults are not receiving health information from healthcare providers and they may be less knowledgeable about HIV/AIDS compared with younger counterparts African-American men (Coleman & Ball, 2007).

The study conducted by Klein and colleagues (2003) indicated that risky behaviors were common among the women who did not perceive themselves to be at risk of HIV. Other research advised that persons with steady partners have a lower perceived risk of getting HIV compared with those engaged in more casual partners (Reisen & Poppen, 1995). It is essential to educate women that lack of uncertainty about their partners' sexual risk behaviors outside of their relationship indicates potential risk and use protection regularly (Cole, Logan & Shannon, 2008). Additional barriers to practice safer sex (condom use) and HIV prevention behaviors include the perceptions that monogamous relationships with known and/or trusted partners are 'safe', thinking condom use unnecessary. Individuals believe that monogamy is a sufficient safeguard against HIV infection (Timmons & Sowell, 1999). Evidence indicates that individuals' sexual behavior with steady partners is particularly resistant to use condom because of trust (Misovich et al., 1997; Theall, Sterk, & Elifson, 2003). Other research has found that persons with more sex partners perceive themselves to be at greater risk of HIV transmission (Britton, Levine, Jackson, Hobfoll, & Shepherd, 1998; Maurier & Northcott,

2000; Weinhardt, Carey, & Carey, 2000). Also, the findings show that women using illicit drug perceive themselves to be increased risk of HIV.

Knowledge gaps, perceived susceptibility, resistance to condom use, and the relationship between drug use and risky behavior must be addressed in HIV prevention education programs targeted toward older African Americans (Jackson, et al., 2005). This study seeks to determine the differences of perceived risk and HIV risk behaviors between older and younger age group.

2.5 HIV/AIDS in Southern United States

HIV epidemics appear to have stabilized in some cities in the United States, but, new infections are steadily increasing in others (Kalichman et al., 2011). In the southeastern United States, annual trends experienced dramatic increases in new HIV infections over the past decade (El-Sadr, Mayer, & Hodder, 2010). More than 50% of new HIV infections occur in the South, and six of the top 10 states with the highest number of AIDS cases are in this region (Kaiser Family Foundation, 2008). Factors such as poverty, unemployment, inadequate access to healthcare, and socio cultural issues may contribute to this trend (Hixson et al., 2011). In the southern United States, heterosexual HIV transmission has escalated with marked racial disparities and high rates among African Americans, especially black women (Adimora et al., 2006). In an area of the southern United States with high HIV rates, survey data discovered extensive concurrency and evidence of dense sexual networks between the general population and high-risk, high-prevalence subgroups. These mixing patterns efficiently transmit HIV throughout the population. Socioeconomic factors such as racial discrimination and

deprivation of economic opportunities inhibit stable sexual partnering and increase the likelihood of concurrent partnerships and increase the spread of Sexually Transmitted Infections including HIV.

More than 30 years into the HIV epidemic, the state of Georgia was ranked sixth in the nation for its cumulative reported rate of AIDS cases through December 2009. Most of those newly diagnosed with HIV were African-American men in the 20–24 age category (Hixson et al., 2011). African Americans make up only 31% of Georgia's population and accounted for 77% of HIV/AIDS cases diagnosed in 2010. Atlanta is a city with smaller geographic area centrally located in Fulton and DeKalb counties with a diverse population including a majority of African Americans (55.8%). The HIV epidemic in Atlanta is concentrated in one large cluster characterized by poverty, men who have sex with men (MSM), and IV drug usage (Hixson et al., 2011). Residents in poor areas may have a greater chance to participate in illegal drug use and engage in prostitution at higher risk for HIV infection. In the same way, Blacks and Hispanics are more likely to live in areas with greater poverty (Hixson et al., 2011). The poverty rate in Atlanta is 21% compared to the state of Georgia's 13% (Kalichman et al., 2011). Twelve percent of Atlanta's residents have incomes below 50% of the poverty level. Additionally, the Atlanta metropolitan area had the greatest percentage of people living with HIV/AIDS in the state (66%). African American represents seventy-four percent of new HIV/AIDS diagnoses. According to the 2011 report by the Georgia Division of Public Health, the findings indicated that, although the funding for prevention and care increased in recent years, it is continue to exist the gaps in knowledge, prevention, and intervention services related to HIV.

In summary, HIV continued to be transmitted at unexpectedly high rate among African Americans. Lengthening of the average Americans life span leads to increase number of individuals older than 50 years of age. Consequently, the topic of aging with HIV has emerged as one of the leading issues in the United States.

CHAPTER III

METHODS and PROCEDURE

3.1 Background

The study was conducted to compare social network characteristics, perceived risk and HIV risk behaviors between older and younger African Americans living in high HIV prevalence zip codes of Atlanta, Georgia. A total of 897 men and women were included in the study. Data in the study are secondary and de-identified. This study was approved by the Georgia State University Institutional Review Board (IRB) on September 12, 2012.

In the study, the data were obtained from the research conducted by Dr. Rothenberg and colleagues funded by the National Institute on Drug Abuse. From 2005 to 2011, the data were gathered in the Geography Project conducted by Rothenberg and colleagues in Atlanta, Georgia. That project studied the role of geography, networks, and risk in the transmission of HIV and other sexually transmitted diseases (STDs) in inner city neighborhoods of Atlanta. The objectives of the project were to assess the geographic, behavioral, and social characteristics of people at risk due to drug use and sexual activity in high- and low HIV prevalence areas and also to determine the influencing factors on the prevalence and incidence of HIV and other six STDs (Rencher, W.C., 2012).

3.2 Data Collection

In the project, participants were selected from total ten ZIP codes of Atlanta, Georgia; five ZIP codes of Atlanta, Georgia with high prevalence rates for HIV (30318,

30314, 30310, 30315, and 30308), and five ZIP codes with intermediate rates (30349, 30331, 30337, 30344, and 30311) next to the five high prevalence zip codes. Five high prevalence zip codes were representing 30% of AIDS cases in Fulton County from 1998 to 2003. A first six month period of ethnographic investigation was used to find out three seed persons from each ZIP code and seed persons were those at risk due to sexual or drug use and they don't know each other. Each seed was interviewed and then asked to name 10-12 contacts and to select one of them another seed in the chain. The process was continued until three chains of three persons each and their contacts were in each ZIP code (Rencher, W.C., 2012).

The standard interview questionnaire included questions about socio demographic, behavioral, medical, sexual, and drug-using factors; as well as information about their contacts, such as geographic location, their relationship, and any shared sexual or drug using experiences. This questionnaire was asked to seed person in each chain and their named contacts (some, but not all). Additionally, respondents were offered testing and counseling for HIV and other six STDs. The persons with positive test result were referred to the local health department. From 2008 to 2011, interviews were repeated annually. The data used in the present study were obtained from the final interviews (Rencher, W.C., 2012).

3.3 Study Population

For the study, the population under analysis is total 897 including 469 male and 415 female. The study population consists of Non-Hispanic Black (African American) in 10 zip codes of Atlanta, Georgia. The age range of population is 18 to 75 year.

3.4 Study Variables

Independent variables (Socio-demographic variables)

i. Age

Age was categorized into two groups: younger (18-49 year) and older (≥ 50 year).

ii. Gender

Gender was categorized as either being male and female. Transgender group was treated as missing.

iii. Sexual orientation

Respondents were also asked to identify their sexual orientation from a list of possible answers: homosexual, heterosexual (straight), bisexual, gay, lesbian, transgendered, transsexual, and other. Responses were re-coded into two: heterosexual and homosexual (including gay/lesbian, homosexual, and bisexual). Other (including transgendered and transsexual) sexual orientations were treated as missing.

iv. Marital Status

Possible answers were single (never married), married or common law, divorced, separated, and widowed. Three categorical were created; single (never married), married, and divorced/separated/widow.

v. Education

Possible answers were none, elementary school (K-8), some high school (9-11), GED, high school graduate, some college or technical training, college graduate, and graduate work. Responses were re-coded into two categories: less than high school diploma and higher than GED or high school graduate.

vi. Current work situation

Responses were re-coded into Unemployed and employed (including illegal work). Other job variables were treated as missing.

vii. Homeless

Dichotomous variables of homeless are “Yes” or “No”. For the present analysis, answers of “not asked” or “don’t know” or “refuse to answer” were treated as missing.

Dependent variable

i. HIV status

Dichotomous variables of HIV status are “Yes” or “No”. For the present analysis, answers of “not asked” or “don’t know” or “refuse to answer” were treated as missing.

ii. HIV testing

- The dichotomous variables of the self reported HIV testing were taken directly from the original survey, which asked participants to give “Yes” or “No” answers.
- Year last tested was calculated from the subtraction of date of the last time tested from the date of interview.

iii. Social network characteristics

iii.a Number of network member

Mean number of people named in their network was calculated.

iii.b Role and Strength of Relationship

- Role of relationship were rated a Mother, Father, Sister, Brother, Grandmother, Grandfather, Aunt, Uncle, Cousins, Daughter, Son, Wife, Husband, Girlfriend, Boyfriend, Friend, Acquaintance, and Other. For this study, “Immediate

family” was assigned a value of zero, “relative” a value of 1, “friend” a value of 2, and “other” a value of 3.

- The strength of relationship with this person can be rated from 1 to 10, 1 being an acquaintance to 10 is a best friend.

iii.d Frequency of meeting last 3 month

- Participants were asked how often they have seen this person in the last 3 months. Answers will be not at all, once or twice, three to six times, at least a couple of times a month, weekly, and daily. The answers were re-coded into three categories; not at all, once/twice/three/six (including a couple time a month, weekly), and daily. Answers of “not applicable” or “not asked” or “refuse” or “not known” were treated as missing.

iii.e Drug use with this person

- Drug used variable of this person in the network were dichotomous and were taken directly from the original survey, which asked participants to give “Yes” or “No” answers. The question is “Have you ever used drugs with this person? (Either non-injectable or injecting without sharing needles and syringes)?”

iii.f Sexual contact with this person

- The question “Have you ever had sexual contact with this person?” will be asked to participants and answer will be “Yes” or “No”. Answers of “Not Asked” or “Refused” or “Don’t know” were treated as missing.

iv. Perceived risk

iv.a Perceived risk of getting the AIDS as “medium” or “high”

Participants were asked to rate their perceived risk of getting the AIDS.

They could rate their risk as high, medium, low, none, already infected, not asked, refused, or don't know. For this study, "High or medium" was assigned a value of zero and "low or none" a value of 1. For the present analysis, answers of "already infected" or "not asked" or "refuse to answer" or "don't know" were treated as missing.

iv.b Perceived risk of network member getting the AIDS

Participants were asked to rate their perceived risk of chances of network member who isn't already infected, getting the AIDS virus. They could rate their risk as high, medium, low, none, already infected, not asked, refused, or don't know. For this study, "High or medium" was assigned a value of zero and "low or none" a value of 1. For the present analysis, answers of "already infected" or "not asked" or "refuse to answer" or "don't know" were treated as missing.

v. Sexual risk behaviors

v.a Multiple sexual partner in the last 6 month

Participants were asked to count the number of partners who you have sex in the past 6 month. The following are the questions for women and men.

- In the past 6 months, with how many different women have you had sex?
- In the past 6 months, with how many different men have you had sex?

The new variable was created by combination of these above two questions and another new variable (Multiple sexual partners) was defined. Person with more than four sexual partners was defined as multiple sexual partners. The response was re-coded into dichotomous "Yes" or "No".

v.b Risky sexual partner

- Participants were asked to describe the relationship with the last person you had sex with. It could categorize as steady partner, casual partner, paying partner, charging partner and other. The response has two categories; steady or casual partner and paying or charging partner. The responses were dichotomous “Yes” or “No”
- The sexual activity dichotomous variables were taken directly from the original survey, which asked participants to give “Yes” or “No” answers. The two questions related to sexual activity were included in this study:
 - Have you had vaginal sex in the past 6 month?
 - Have you had anal sex in the past 6 months?

v.c Protected anal and vaginal sex in the last 6 month

Participants were categorized as always, usually, sometimes, rarely, and never. The responses were re-coded into dichotomous “Yes” or “No”. For the present analysis, answer of “always” was assigned as “Yes” and “usually, sometimes, rarely and never” was assigned as “No”. Answers of “refused” or “not application” or “not asked” or “don’t know” were treated as missing.

- During the past 6 months, when you have anal sex, how often is a condom used?
- During the past 6 months, when you have vaginal sex, how often is a condom used?

v.d High risk sexual behaviors

Person with more than four sexual partners was defined as multiple sexual partners. High risk sexual behaviors were defined as the combination of above behaviors:

1) Multiple numbers of sex partners, 2) anal sex in last 6 month with unprotected intercourse, and 3) vaginal sex in last 6 month with unprotected intercourse. Variable of high risk sexual behaviors was dichotomous “Yes” or “No”.

vi. Drug use risk behaviors

vi.a Drug used variable were dichotomous and were taken directly from the original survey, which asked participants to give “Yes” or “No” answers. The following questions were included in this study:

- Have you ever injected?
- Have you ever shared your works with someone else (let them inject with a needle and syringe you have used), without first cleaning it with bleach?
- Did you clean your works in the last time?

3.5 Statistical Analyses

Statistical analyses will be performed using IBM SPSS Statistics version 20.

Descriptive analysis was conducted on the demographic variables such as gender, sexual orientation, marital status, education, work situation, homeless, social network characteristics, perceived risk, high risk sexual and risky drug use behaviors. The mean and standard deviation (SD) were computed for the continuous variable of age while frequencies and percentages were computed for all other categories variable.

Univariate analysis and multivariate analysis were used to compare. Univariate analyses were used to illustrate each variable and the results of frequencies and percentages were reported. The mean and standard deviation (SD) were computed for the continuous variable by using independent sample t-test. Chi-square analyses were used to describe the frequencies and percentages of all categorical variables and P-values were calculated to assess signification of the association of these variables.

Multivariate analyses were performed using binary logistic regression to control for the variables shown to have significant associations in the univariate analysis. Associations were determined by odds ratios and significance by 95% confidence intervals for each dependent variable. P-values were calculated to assess the signification of the association of these variables. $P < 0.05$ is used to determine statistical significance among variables and analysis with $p < 0.01$ is supposed to be highly significant.

CHAPTER IV

RESULTS

Study sample description

A total of 897 African American were selected for the study; 733 (81.7%) of participants were younger and 164 (18.3%) were older. The average age of the younger group was 32 years and the older group was 55 years. The youngest participant was 18 year old and the oldest participant was 75 year old.

Univariate Analysis

For this study, univariate analysis was computed to compare dependent and independent variables between older and younger age group.

Table (1) Comparison between older and younger African Americans on socio-demographic Variables

Total N=897	Younger N (%)	Older N (%)	
Gender	733 (81.7)	164 (18.3)	
Male	358 (49.7)	111 (68.1)	
Female	363 (50.3)	52 (31.9)	P<0.001
Sexual Orientation			
Heterosexual	622 (85.0)	154 (93.9)	
Homosexual (Gay/lesbian/Bi)	107 (14.6)	10 (6.1)	P=0.003
Marital Status			
Single, never married	574 (78.4)	71 (43.3)	
Married	70 (9.6)	14 (8.5)	
Divorce, separated, divorce	88 (12.0)	79 (48.2)	P<0.001
Education			
Less than high school graduate	350 (47.8)	64 (39.0)	
High school graduate or higher	382 (52.2)	100 (61.0)	P=0.041
Work situation			
Unemployed	398 (58.6)	53 (32.9)	
Employed	281 (41.4)	108 (67.1)	P<0.001
Homeless			
No	625 (86.0)	121 (73.8)	
Yes	102 (14.0)	43 (26.2)	P<0.001

First, the older and younger samples were compared on socio-demographic variables by using chi-square tests. As shown in Table 1, there were 358 Male (49.7%) and 363 female (50.3%) in younger group and 111 male (68.1%) and 52 female (31.9%) in older group. More persons in the older age group (93.9%) reported heterosexual sexual orientation than younger group (85%) and the difference were statistically significant. In marital status, less percentage of older people (43.3%) was single than younger group (78.4%) and significantly different. One interesting findings was that 43.3% of older people were single and never married. In regard to education, a smaller percentage of younger people (52.2%) attended the college than older people (61%), and it was statistically significant. Likewise, the younger group had a lower proportion of employed (41.1%) than the older group (67.1%). The older group was more significantly likely to be homeless and the difference was highly notable with P value <0.001.

Table (2) Comparison of older and younger African Americans on social network characteristics

Total N=897	Younger N (%) 733 (81.7%)	Older N (%) 164 (18.3%)	
Social network characteristic			
Mean No. of network member (SD)	12.43 (6.93)	11.62 (8.12)	P=0.19
Role of relationship			
Immediate family	431 (59.0)	93 (56.7)	
Relative	123 (16.8)	14 (8.5)	
Friend	131 (17.9)	39 (23.8)	
Other	45 (6.2)	18 (11.0)	P=0.005
Mean strength of relationship (SD)	8.97 (2.0)	8.84 (2.56)	P=0.47
Frequency of meeting (last 3 month)			
Not at all	373 (51.3)	76 (46.6)	
^a Once/twice/three/six	339 (46.6)	85 (52.1)	
Daily	15 (2.1)	2 (1.2)	P=0.38
Used drug with the partner			
No	280 (41.3)	64 (40.5)	
Yes	398 (58.7)	94 (59.5)	P=0.86
Sexual contact with the partner			
No	96 (44.9)	24 (44.4)	
Yes	118 (55.1)	30 (55.6)	P=0.96

^aincluding a couple times a month, weekly

Next, comparison of these two groups on social network characteristics was performed by using chi-square tests and independent sample *t*-tests (Table 2). As shown in the table, role of relationship of contact person was only variable with statistical significant difference between younger and older age group. One surprising finding is that older age group (23.8%) have more likely to have relationship with their friends than younger ones (17.9%) which have more relationship with immediate family (59%) and the result was significantly difference. The mean number of network member was 12.4 in younger and 11.6 in older group respectively, but this observation was not significant different. Based on the strength of relationship on a scale of 1-10, the two groups were similar strong level-9 of strength of relationship with their network members. Regarding

to the frequency of meeting with network member, the similar percentage of both groups didn't meet their member during the last 3 month (51.3% in younger group and 46.6% in older group), however, no statistical difference was noted. There is no significant difference of percentage of both groups who have drug use and sexual contact with their partner.

Table (3) Outcome variables

	Younger N (%)	Older N (%)	
HIV status			
No	715 (97.7)	157 (95.7)	
Yes	17 (2.3)	7 (4.3)	P=0.163
HIV testing			
No	85 (11.7)	30 (18.8)	
Yes	644 (88.3)	130 (81.2)	P=0.016
Year last tested			
Mean (SD)	1.52 (2.56)	2.64 (4.43)	P<0.001
Perceived risk			
Perceived risk of getting HIV			
High or medium	127 (17.9)	39 (25.0)	
Low or none	584 (82.1)	117 (75.0)	P=0.04
Perceived risk of network member getting HIV			
High or medium	366 (51.8)	89 (58.6)	
Low or none	340 (48.2)	63 (41.4)	P=0.133
Drug use risk behaviors			
Ever injected drug			
No	660 (95.4)	106 (66.2)	
Yes	32 (4.6)	54 (33.8)	P<0.001
Shared your work without first clean (IV)			
No	23 (65.7)	40 (74.1)	
Yes	12 (34.3)	14 (25.9)	P=0.397
Clean your work in last time			
Yes	20 (74.1)	34 (75.6)	
No	7 (25.9)	11 (24.4)	P=0.888
Sexual risk behaviors			
Multiple sexual partner(≥ 4)			
No	544 (77.4)	117 (83.6)	
Yes	159 (22.6)	23 (16.4)	P=0.104
Risky sexual partner			
No	651 (90.7)	124 (78.0)	
Yes	67 (9.3)	35 (22.0)	P<0.001
Anal sex in last 6 month			
No	622 (89.1)	133 (97.1)	
Yes	76 (10.9)	4 (2.9)	P=0.004
Vaginal sex in last 6 month			
No	31 (4.4)	14 (10.3)	
Yes	668 (95.6)	122 (89.7)	P=0.006
Protected anal sex in the past 6 month			
No	40 (53.3)	1 (25.5)	
Yes	35 (46.7)	3 (75.0)	P=0.269
Protected vaginal sex in the past 6 month			
No	437 (65.2)	74 (60.7)	
Yes	233 (34.8)	48 (39.3)	P=0.332
Risky sexual behaviors			
No	24 (3.4)	20 (14.0)	
Yes	686 (96.6)	123 (86.0)	P<0.001

Third, we compared these two groups on outcome variables by using chi-square and independent sample *t*-tests (Table 3). 4.3% of older group and 2.3% of younger group reported that they had HIV infection with no significant difference. 88.3% of younger group and 81.2% of older adults reported previous HIV testing with significant difference. There is a significant difference of the mean period of time since last tested for HIV between two group (1.5 years in younger group and 2.6 years in older group respectively, $P < 0.001$). When it came to HIV risk perception, 25% of older adults were significantly higher susceptibility to HIV risk than in younger group (17.9%) based on their current behaviors. Additionally, both groups have similar percentage of having high or medium perceived risk of network member getting HIV and the result wasn't statistically significant.

Regarding to the drug use behaviors, older respondents (33.8%) were more significantly likely to be injecting drug users than younger ones (4.6%). The significant differences were not found between the two groups on sharing their work without cleaning and clean their work last time shot up. Higher proportion of younger age group (34.3%) was likely to share their works with others than older ones (25.9%). Both groups have similar percentage of cleaning work in last time (74.1% and 75.6% in younger and older group respectively).

Regarding sexual risk behaviors, younger aged group (22.6%) have more likely to have multiple partners than older group (16.4), but, it is not statistically significant. A significant greater percentage of older adults (22%) have sexual relationship with risky partner than younger ones (9.3%) at P -value < 0.001 level. Respondents who were younger than 50 years of age were more likely to have anal and vaginal sex in the last 6

months with significant different results. In addition, participants were asked to estimate how often they used a condom in the past 6 month when having anal or vaginal sex. The majority of the older group reported protected anal sex (75%) and reported protected vaginal sex (39.3%), however, these values were not statistically difference. There was similar percentage of engaging unprotected vaginal sex in both younger and older groups (34.8% and 39.3% respectively). One important finding is that 86% of older people and 96 % of younger people were high risky sexual behaviors with statistically significant difference ($P<0.001$).

Multivariate Analyses

To assess the independent association of the variables, binary logistic regression analyses were performed using HIV testing, and perceived risk, risky sexual partner, anal and vaginal sex, risky sexual behaviors, injection drug use and risky drug use behaviors as the dependent variables.

Table (4) Adjusted Analyses; Association of independent variables (socio-demographic) and Dependent variables (HIV testing, perceived risk and ever injected drug)

Variables	Tested for HIV AOR (95% CI)	Perceived risk AOR (95%CI)	Ever injected AOR (95% CI)
Gender			
Male (Reference)			
Female	2.00 (1.27-3.15)*	1.28 (0.87-1.88)	0.48 (0.27-0.86)*
Sexual orientation			
Heterosexual (Reference)			
Homosexual	0.72 (0.37-1.41)	0.61 (0.34-1.08)	1.29 (0.45-3.77)
Marital Status			
Single, never married (Reference)			
Married	2.48 (0.96-6.40)	0.77 (0.42-1.44)	0.07 (1.36-6.91)*
Divorced, separated, widow	1.07 (0.59-1.93)	0.83 (0.51-1.36)	1.97 (1.08-3.57)*
Education			
Less than high school graduate (Reference)			
High school graduate or higher	1.48 (0.96-2.27)	1.16 (0.79-1.69)	1.12 (0.66-1.91)
Work situation			
Unemployed (Reference)			
Employed	0.92 (0.58-1.39)	0.91 (0.62-1.34)	0.8 (0.46-1.39)
Homeless			
No (Reference)			
Yes	3.46 (1.54-7.76)*	0.34 (0.22-0.53)**	4.56 (2.61-7.95)**
Age group			
Younger (Reference)			
Older	0.54 (0.31-0.94)*	0.75 (0.46-1.22)	7.72 (4.39-13.6)**

*p<0.05, **P<0.001, AOR= Adjusted Odd Ratio

To assess the independent association of the variables in Table (4), binary logistic regression analyses were performed using HIV testing, and perceived risk as the dependent variables. For testing of HIV, female are more likely to test for HIV than male (AOR=2.0, P<0.05). Being a homeless was also significantly positive association with HIV testing (AOR=3.46, P<0.05). Regarding to perceived risk of getting HIV, being a homeless was significant negatively associated with low level of perceived risk of getting HIV (AOR=0.34, P<0.001). The multivariate analysis strengthen the association of age group and HIV testing, but, no significant the association between age group and

perceived risk of getting HIV. Older people are less likely to test HIV than younger people (AOR=0.54, P<0.05). Older people are also less likely to perceive low or no risk of getting HIV than younger people with no significant difference (AOR=0.75, P=0.25).

Regarding to injecting practice, female respondents were less likely to inject drug than male respondents (AOR=0.48, P <0.05). Married persons were less likely to inject drug than single people (AOR=0.07, P<0.05), People who divorced, separated and widowed, were more likely to inject drug than single ones (AOR=1.97, P<0.05). One important finding is that being a homeless was more significant positively associated with injection of drugs (AOR=4.56, P<0.001).

Table (5) Adjusted Analyses; Association of independent variables (socio-demographic) and dependent variables (risky partners, Anal and vaginal sex and risky sexual behaviors)

Variables	Risky sexual partner	Anal sex (last 6 month)	Vaginal sex (last 6 month)	Risky sexual behaviors
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Gender				
Male (Reference)				
Female	0.70 (0.41-1.19)	0.92 (0.53-1.58)	1.94 (0.82-4.57)	1.45 (0.68-3.09)
Sexual orientation				
Heterosexual orientation (Reference)				
Homosexual	3.21 (1.62-6.36)**	3.18 (1.67-6.07)**	0.1 (0.04-2.25)	0.39 (0.15-1.06)
Marital Status				
Single, never married (Reference)				
Married	0.13 (0.02-0.97)*	0.46 (0.14-1.53)	3.34 (0.43-25.77)	NA
Divorced, separated, widow	1.24 (0.79-2.56)	1.03 (0.49-2.18)	2.12 (0.74- 6.01)	0.73 (0.33-1.59)
Education				
Less than High School(GED) (Reference)				
High School or higher	0.64 (0.38-1.06)	1.48 (0.86-2.56)	0.94 (0.44-2.03)	1.18 (0.59-2.38)
Work situation				
Unemployed (Reference)				
Employed	0.94 (0.55-1.58)	1.19 (0.69-2.06)	0.87 (0.39-1.96)	1.12 (0.54-2.33)
Homeless				
No (Reference)				
Yes	4.79 (2.84-8.08)**	1.40 (0.69-2.83)	0.59 (0.25-1.43)	0.68 (0.31-1.52)
Age Group				
Younger (Reference)				
Older	2.81 (1.57-5.04)**	0.28 (0.09-0.84)*	0.15 (0.06-0.38)**	0.20 (0.09-0.45)**

*p<0.05, **P<0.001, NA = not applicable, AOR= Adjusted Odd Ratio

As seen in table (5), binary logistic regression analysis was used to examine the association of age group and different dependent variables such as risky sexual partners, anal and vaginal sex in last 6 month, and risky sexual behaviors. Significantly more homosexual adults were likely to have sex with risky partner (AOR=3.21, P<0.001) and engaged anal sex (AOR=3.18, P<0.001).

Married people were engaging less likely to have sexual practice with risky partner than single people (AOR=0.13, $P<0.05$). Being a homeless has high significant level of engaging sex with risky partner (AOR=4.79, $P<0.001$).

Older people are strongly positive association with risky partners than younger people (AOR=2.81, $P<0.05$). Older people were less likely to have anal sex (AOR=0.28, $P<0.05$) than younger people in the last 6 month. Older adults were less likely to have vaginal sex than younger respondents (AOR=0.15, $P<0.001$). There is still high significant negative association with high risk sexual behaviors in older adults than in younger people after adjusting socio-demographic variables in multivariate analyses (AOR=0.2, $P<0.001$).

CHAPTER V

DISCUSSION and CONCLUSION

Although there are extensive prevention campaigns to educate the public about HIV/AIDS, the rate of incidence in HIV transmission continue to increase progressively among African Americans (CDC, 2007; Stone, 2004). In addition, the issue on HIV/AIDS continued in the state of Georgia and remains an important public health problem especially African American community. In 2010, there were 30% of African Americans comprised in population of Georgia. Among all ethnicities, this group contributed the majority of new HIV transmission and AIDS cases and comprised the largest rate (78%) of new HIV/AIDS diagnosed in 2010. Sexual contact is the primary mode of transmission for the epidemic in Georgia especially among MSM and heterosexual and followed by injecting drug use (HIV/AIDS Epidemiology Section, 2010 & 2011).

According to the basic epidemiology profile of HIV/AIDS, Georgia (2011), the highest numbers of people living with HIV/AIDS were in the Atlanta Metropolitan Statistical Area (MSA) which comprised over 50% of the state population in 2009. The Fulton Health District has only a single county (Fulton) and contains the city of Atlanta. There was a large population with 1,033,756 persons in 2009. This county is one of the health districts with the highest number of people living with HIV/AIDS in the Atlanta metropolitan (HIV/AIDS Epidemiology Section, 2011). Like the other parts in the country, Atlanta is experiencing a dramatic increase in older adult population. Georgia

has the eighth fastest growing older adult population in the country (Atlanta Regional Commission, 2007). According to the Fulton County state of seniors survey (2012), Fulton County's population is aging and recent estimates that within the next two decades, over 30% of Fulton County's population will be over the age of 65. From 2000 to 2010, Fulton County's population over age 65 increased by 8.5%. Adopting healthier life style and the use of preventive services are important in prevention of HIV transmission in this age group. Public health professionals are trying to reduce the HIV incidence rate, increasing access to treatment and care to optimize health outcomes, and reducing HIV-related health disparities. It is essential and important to understanding the epidemiology of HIV/AIDS in African American in Georgia. All of ten zip codes areas in our study are located in Fulton County, Georgia.

The hypothesis of the study is that older African Americans have less small social support, perceived risk and HIV risk behaviors than younger African American in high HIV prevalence zip codes of Atlanta, Georgia. The results of the study showed that there is no difference in term of social network characteristics and perceived risk except that older African Americans were less likely to engage in sexual risk behavior. However, they have significant higher proportion of injection drug, less likely to be tested for HIV, and more likely to have a risky sex partners.

Interpretation of Findings

Overall, findings in the study showed that 43% of older adults are single and never married in their lifetime and 26 % are homeless. Both groups reported similar percentage in engaging high risk unprotected anal and vaginal sex in the last 6 month. In

the research on older adults with HIV (Brennan, M, et al., 2009), participants reported that they engaged in unprotected sex due to the desire for sex, sex with an attractive partner, partner's request, being high on drugs, depression or neediness, and belief of low risk of STD (Brennab, M. et al., 2009). Significantly less proportion of older adults reported HIV testing than those in the younger group. Among older adults, they also had a greater percentage and high odds ratio of engaging in drug injection (P value <0.001). Additionally, being homeless is one of the contributing factors for engaging in high risk behaviors in this group. In the homeless population, HIV/AIDS is even more prevalent and both are closely related. A large number of homeless people inject drugs intravenously, and also share or reuse needles. This risky drug use practice is responsible for 13% of HIV/AIDS diagnosed in the United States (The National Coalition for the Homeless, 2009). Moreover, according to National Coalition for the Homeless (2012), elderly persons are a growing population who experiences homelessness. In multivariate analysis, being homeless is still significantly positively related with drug use, sex with risky partners, and anal sex.

Older age group reported heterosexual sexual orientation more than younger group who reported more homosexual orientation. One study found that among MSM, young MSMs were more likely to report gay sexual identity than older MSM (Bocour et al., 2011). Regarding to marital status, less proportion of older people was single than younger group, but, one interesting finding was that 43% of older people are single and never married in their lives. According to the U.S. Census (2003), 42% of African American adults are married compared to 61% for Caucasians and 59% for Hispanics. African Americans have the lowest marriage rate, the highest divorce rate, the highest

rate of children born outside of marriage, and the highest rate of never married persons compared to all racial and ethnic groups (Chambers & Kravitz, 2011).

Social Network Characteristics

Older people have more relationship with friends than younger people with significant findings. Apart from this finding there was no difference in average number of network member, and having sexual contact and drug use with their partners. Both groups have similar percentage of relationship with immediate family member (Father, mother, spouses, children, etc.). In addition, the absence of spouse and partners in older adults was significant because there were only 8.5% of participants who were married and other are 43.3% single and 48.2 % who were divorced, widowed and separated.

One of the few studies of social support for older adults found that it positively affected mood and distress levels (Schrimshaw and Siegel, 2003). Retirement, illness, death of family, friends and loved ones could result in narrowing social networks and also the sources of inadequate support (Baltes & Baltes, 1990 & Emlet, C. A., 2006). In the Research on Older Adults with HIV (Brennan, M. et al.,2009), it consistently demonstrated that presence of family, friends and neighbors positively affects on the sufficient care of people who are growing older (Canter & Brennan, 2000).

In the study “*Hierarchical Compensatory Model of Social Support* proposes”, Cantor (1979) described that older people more preferred support from partners, spouses and children. If these types of support were not available, they seek supports from other family members, friends, and neighbors. When these informal types of social network

were insufficient or unavailable, the older people tried to search the formal support, such as community-based organization or government agencies.

There is a similar number of network members, high level of strength of their relationships, and frequency of meeting with their network member in both younger and older group. Both groups also reported having sexual contact and drug use with their partners (approximately 40% of participants in each group). The data in the research on older adults with HIV (Brennan, M. et al., 2009) described that although the older adults have large and diverse social networks, the majority of participants reported that they didn't receive sufficient support. Among older adult population, older minorities had smaller social networks and were more loneliness than older whites or younger ones (Emlet, 2006b). It is clear that it is essential to fill the gap for unmet needs of this population in the future. Furthermore, it is important for social workers and public health professionals to consider the potential vulnerabilities of HIV transmission among older African Americans. Regarding to social network, the critical aspect is not only the size but also the functionality of this network (Cantor, M. H. et al., 2009). Further research is need to examine the functional support among older adults especially African Americans to establish the effective strategy to educate, counsel, provide service delivery for prevention of new infection and transmission of HIV.

HIV testing

Only 2.3% in younger group and 4.3% in older adults reported HIV positive with no significant difference. In the Research on Older Adults with HIV (Brennan, M. et al., 2009), compared with LGBT (Lesbian, Gay, Bisexual and Transgender), stigma was

significant higher among heterosexuals. Older blacks (66%) were less likely to disclose their status to social organizations than Whites (80%) (Brennan et al., 2009). Significant larger proportion of younger group reported previous HIV testing than older group. According to the Centers for Disease Control and Prevention (2012), there were a large proportion (60%) of older MSM reported having not tested in the 2 years before HIV diagnosis. For older adults, they need to distinguish symptoms of HIV infection from those of aging process and sometimes, they confuse these symptoms leading to delay testing (Siegel, Schrimshaw, and Dean, 1999a, b). Additionally, due to the fear of stigma, Foster and Gaskins (2009) found that older African Americans were reluctant to disclose their HIV status. 68% of older individuals experienced both HIV stigma and ageism (Emlet, 2006c). Moreover, public health prevention strategies often fail to address older persons. For HIV-infected persons, physicians should discuss HIV infection and other sensitive issues, such as sexuality, and HIV-related stigma. There were 330 primary care physicians in one survey, and 61% of the physicians were less likely or never discuss HIV with their older patients. 68% were reluctant or never discussed HIV related risk behaviors and prevention messages (Skeist & Keiser, 1997). For these reasons, among older adults, diagnosis with HIV is often delayed. Training to health care providers is also needed to increase awareness of sexuality issues and risk behaviors among older adults (Brennan, M. et al., 2009).

Perceived Risk

Perceived risk of getting HIV/AIDS is significantly higher in older age group (25%) than in younger group (17.9%). In contrast with this finding, a study conducted by

Jackson and colleagues (2005) described that older African Americans believe that HIV/AIDS is a serious disease but do not feel personally susceptible to acquiring it. Previous studies have identified that even though older adults have relatively high levels of HIV/AIDS knowledge, many still believe HIV can be acquired through casual (i.e., nonsexual) contact. Previous studies have documented that a majority of older individuals are not involved in high risk behavior and that there is resistance to condom use among those who do have sex with multiple partners. Despite risk behaviors, rates of HIV testing are low among older African Americans, particularly African American men (Jackson, 2005). According to Centers for Disease Control and Prevention (CDC) guidelines, although routine opt-out testing for HIV was recommended, most of the HIV screening is based on individual self perceived HIV risks. In U.S., there were over 1 million Americans living with HIV/AIDS. Among them, more than 20% do not know they are infected (HI, H. et al., 2008). If they do not know their HIV status, they may unsuspectingly transmit the virus (Weinstock, H. et al., 2002). In the United State, more than half of new infections are transmitted by HIV infected persons who do not know their sero-status (MMWR, 2003, & Marks et al., 2006). Several studies showed that if individuals who know their HIV status can avoid and reduce high risk sexual behavior (Marks et al., 2005, & Kamb et al., 1998) and start treatment which can reduce viral load, then they will lower the risk of transmitting HIV infection (Quinn et al., 2000). The rapid HIV testing program was conducted in Philadelphia and the target populations were those with multiple high-risk behaviors, such as, low rates of condom use, substance use, and exchanging sex for money or drugs. Even though people were engaging in risky behaviors, they did not perceive themselves at risk for getting HIV. In the sample, only

11% of individuals reported always using condoms. In conclusion, their findings suggested that in this urban area, self-perceived risk of HIV is an insensitive reason for HIV screening especially African American population. Likewise, routine testing can also assist de-stigmatize HIV testing in this community (Nunn, A. et al., 2011).

Drug use behaviors

In univariate analysis, significant proportion of older people have positive association with having injection of drug, but, both group have similar proportion (about 25-30%) of drug use behaviors such as shared their work without first clean and clean their work in last time. In contrast to this findings, although the rate of HIV transmission among injection drug users (IDUs) in the U.S. has been declining, studies suggested younger IDUs were at increased high risk for HIV infection (Broz, D. et al., 2009). In 2009, CDC conducted a 10,000-person survey, one of the findings was that injection drug users under 30 had less than half the HIV prevalence of older IDUs. But younger IDUs were more likely to engage in risky sexual and injection behaviors than older adults. In 2009, CDC researchers conducted a survey of adult IDUs in 20 metropolitan areas to assess HIV rates and risks in younger versus older IDUs. In this survey, researchers found that compared with older IDUs, younger IDUs had higher odds of several risky drug use and sexual behaviors; more likely to share needles and syringes in past year: OR 2.1 (95% CI: 1.9 to 2.4), unprotected vaginal/anal sex in past year: OR 2.9 (95% CI: 2.4 to 3.4), and multiple sexual partners in past year: OR 1.9 (1.7 to 2.1). Conversely, HIV testing was more likely in younger IDUs who were more likely to get tested for HIV in the past year (OR 1.2, 95% CI 1.1 to 1.3) and to purchase sterile needles and syringes

from pharmacies (OR 2.3, 95% CI 2.1 to 2.6). In this study, anonymous testing was conducted and finding showed that HIV prevalence in older IDUs was 10%, compared with 4% in younger IDUs.

Sexual Risk Behaviors

A significantly greater proportion of older people have sexual relationship with risky partners (paying partner or changing partner) than younger counterparts. Respondents older than 50 years of age were less likely to have anal sex in last 6 month. One important finding is that both age groups have about 35-40 percentage of engaging unprotected vaginal sex. Another significant finding was that older people were less likely to engage in high risk sexual behaviors than younger people in this study. In the multivariate analysis, after controlling the socio-demographic variables, the finding is still significant. In contrast to this finding, a study found that the greatest obstacle to HIV prevention with this older population is reluctant to use condoms (Jackson et. al., 2005). Previous studies have documented a resistance to condom use among older adults who have sex with multiple partners (Jackson et. al., 2005). Older African American men, both heterosexual and MSM, engage in considerable risky sexual behavior, including having unprotected sexual intercourse with multiple partners as well as unprotected sex with commercial sex workers; some are also long time users of street drugs (Jackson et al., 2005). It is clear that there are continuing risk behaviors among the senior members of our population.

Strength and Limitation

There are strengths in the present study and the sample size was large at 897 African American. The participants were recruited from the ten zip codes and the sample was generally representative of the population in these zip codes. The data were gathered in the Geography project. To establish a better relationship with the community involved in this study, the study design involved six months of preliminary research, including focus groups and small surveys. This approach improved follow up and higher support in the design of the final questionnaire. Additionally, the three seeds in each ZIP code were eventually form several chains of contacts and also were carefully selected to be representative and active person in their communities. It needs to make sure that the seeds were not known to each other and also ensure that more contacts could be named to increase the sample size.

The study also has limitations. Due to the cross-sectional nature of the data, causality was not ascertained from this study and only association could be concluded through the analysis conducted. The results of this study may not be generalized to the populations. Questions related to social network characteristics were somewhat limited. While the interviews were confidential, there is potential for bias due to the fact that the data are self-reported. There may be recall bias or participants may give socially acceptable answers to the sensitive questions.

Conclusion

The comparison of social network characteristics, perceived risks of getting HIV and HIV risk behaviors between older and younger African Americans in 10 zip codes of Atlanta, Georgia, was examined using the data from the study conducted by Rothenberg

and colleagues between 2005 and 2011. Findings in the study indicated that older African Americans have a high significant proportion of injection drug use, less likely to be tested for HIV, and more likely to have sex with risky partners. But they were less likely to engage risky sexual behaviors and both groups have similar social network characteristics and perceived risk of getting HIV. Moreover, our results also highlighted there was no differences in terms of their perceived risk of HIV and social network characteristics between these two groups. Health care providers should start discussion about HIV and related risk behaviors as a starting point for further exploration. Additional research is necessary to understand HIV related drug use and sexual risk behaviors of older African Americans. It is important to explore special needs and establish primary prevention efforts of HIV/AIDS transmission among older African Americans.

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