AIDS in Black America: A Study of the City of Chicago

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Abstract
There is an epidemic of HIV/AIDS in African American women in United States, and it is devastating black communities. There is a disproportionate outbreak among black women and adolescents; they are especially at risk these days. They are being infected through unprotected sexual intercourse, drug use and babies being born with AIDS because the mother is infected. Because such a large proportion of black females who carry the disease live in poverty, there is minimal health care, either as prevention or maintenance of victims of the virus. This study examines a possible success story in coping with the epidemic as found in the dramatic decrease of the HIV/AIDS death rates for the city of Chicago. It considers the effects of educational achievement of blacks in relation to the decline in HIV related deaths over a decade in Chicago. Some of the results are surprising and not always hypothesized, for example increases in education did not uniformly lead to a decrease in AIDS cases. The impact of HIV/AIDS regarding black females was as hypothesized. The number of cases increased over the decade and at a statistically significant level.

Keywords: HIV/AIDS, Black females; Healthcare access; Educational status and street drugs use

Introduction
According to the U.S. Center for Disease Control and Prevention, African Americans account for half of all new cases of HIV, the virus that causes AIDS. It is the leading cause of death for black women between the ages of 25 to 34. There are many models proposed to explain an infectious disease development within a specific population including those emphasizing each or some combination of the following factors: biological and genetic, familial, psychological, environmental and cultural. Research on the etiological factors suggests that HIV/AIDS is a complex phenomenon that is determined by many factors, proposing that its origin is best accounted for through a multifactorial perspective [1]. The important question is why something such as AIDS disproportionately affects those who are poor African American and female in the United States? Cognitive characteristics, such as self-efficacy (a judgment of one's ability to cope with a particular situation) and forethought capability (the ability to set goals and to evaluate consequences), in combination with life management skills and coping skills, all come together to determine how people cope with situations in their environment. African Americans learn how to use sexual activity through cultural socialization, which includes socialization in the family, peer groups and larger social contexts like the entertainment media. Through these social experiences they develop expectations about the effects of sexual activity and quite often not isolated from drug use (including alcohol), or beliefs about the effects of prophylactic resources.

The public health model holds that genetic susceptibility interacts with an enabling social environment to accelerate the transmission of the HIV virus. This perspective describes a more complex etiological process, for example that the social environment factors, such as the availability of sexual opportunities within a social group that drinks alcohol heavily (indirectly) or intravenous uses drugs (directly), can increase the level of exposure to HIV. The comorbidity of sexually transmitted diseases and HIV is also a risk factor. Of the country's estimated 18.9 million new cases of sexually transmitted diseases in 2000, nearly half occurred in people between the ages of 15 and 24. Part of the female population testing positive these days. The public health model proposes that HIV/AIDS is the result of an interaction among three causal factors: the agent, the host and the environment. The agent is the virus. The host is the person, and each of which has a complex biological and psychological makeup. The environment is the larger context in which the agent and the host interact. For HIV/AIDS the notion of the environment focuses attention on factors that impede transmission of the virus such as education of susceptible individuals, availability of effective barriers to the transmission of the virus during sexual activity, testing for the virus for those in environments (such as prisons) congenial to the transmission of the virus and appropriate and sometimes innovative medical services. Similar to the public health model, the researched model accommodates the possibility of multiple agents that interact in some disease processes, multiple factors in the host and multiple factors in the environment. The research model proposes that communities heavily affected by the AIDS disease are also heavily affected by crime (victims and perpetrators) [2-5]. HIV/AIDS is disproportionately prevalent in other subgroups whose members frequently live in areas of urban poverty, including homelessness and previously incarcerated populations, with men and women of color being markedly over represented in the later [6]. Figure 1 gives the key factors.

This study focuses on the city of Chicago, Illinois that has experienced a decrease in the reported AIDS case and a more marked decrease in the HIV cause of death cases for residents of the city. Appendix A (II) indicates that in 1999 there were 825 AIDS case deaths while in 2002 the number dropped to 317. Also indicated in the Appendix is the fact that Chicago has a relatively large African American population, 36.4 percent at the time of the 2000 census. Chicago is the only city in the nation that provides the health data on exhibit in the Appendix A by historically established community areas, exactly seventy-seven. This study is designed to determine if education attainment is a factor that contributed to the decrease in HIV/AIDS caused deaths in Chicago. Thus, the major hypothesis of the study is as follows: as education levels of African Americans increase the total numbers of HIV-related deaths

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dependent variable and the negative sign (-) indicates inversely related positive signs (+) before the variable indicates directly related to the population (ages 15-35) and BM =Black males (ages 15-24). The graduate, ED5=graduate and/or professional degree FP=Black female ED2=high school graduates, ED3=college associate degree, ED4=college

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Methodology

Data collection

This study utilizes a cross-sectional design with data available for each community area of Chicago. The community areas of Chicago include a specific number of adjacent census tracts. As early as 1930, the 77 community areas within the city represent statistical units derived by urban sociologist at the University of Chicago from the census in their effort to analyze varying conditions within the city. Data are available by decade up to the 2000 census. Other cities in the United States do not have such convenient classification of neighborhoods.

Measures

The data for HIV deaths comes from the Community Area Health Inventory 1992-2002 Vol. 1(10), City of Chicago, and Department of Public Health. Multiple linear regression analysis is used as a statistical technique. The form of the equation is as follows:

1) HIVD2002= + ED1 + ED2 - ED3 - ED4 - ED5 + FP + BM

2) HIVD1992= + ED1 + ED2 - ED3 - ED4 - ED5 + FP + BM

Where HIVD=HIV deaths, ED1=less than ninth grade education, ED2=high school graduates, ED3=college associate degree, ED4=college graduate, ED5=graduate and/or professional degree FP=Black female population (ages 15-35) and BM =Black males (ages 15-24). The positive signs (+) before the variable indicates directly related to the dependent variable and the negative sign (-) indicates inversely related to the dependent variable.

Selection of variables

Educational attainment: The assumption of this study is that education empowers individuals with increased personal insight, coping skills given the psychosocial stresses of life and life management skills given the challenges of life in general including adherence to a medication regimen related to AIDS [7,8]. For the African American community in Chicago, educational achievement mirrors the national pattern whereby for every one hundred 9th graders only 18 will earn an Associate's degree in 3 years or the BA degree within 6 years (Commission on the Skills of the American Work Force, 2006) [9]. Forty students would have dropped out of schooling altogether. Although 90 percent of whites between the ages of 18 and 24 had received a high school diploma or its equivalent in 1998, only 81 percent of blacks and 63 percent of Hispanics had completed high school. Thus, there is a variable for the number of African Americans with less than 9th grade education. There is a variable for the number of African Americans that completed high school education. This is continued for associates of arts and then completed college and finally graduate and/or professional degree. These educational indicators are those established for census data purposes by the federal government. It is posited that lower educational levels are correlated to HIV/AIDS deaths in a positive manner. As the total number of individuals with less than a ninth grade education increase the number of HIV/AIDS deaths also increase. As the total number of individuals (high school graduates) increases the number of HIV/AIDS death decreases. However, it is posited that higher educational levels are inversely related to the number of HIV/AIDS deaths. As the number of college associates degrees increases the number of HIV death decreases and as the number of college graduates increases the number of HIV/AIDS deaths decreases. And finally as the number of graduates/professional degrees increases, the number of HIV/AIDS deaths decreases. Each of these five variables is used as an independent variable and data are used by each of the 77 community areas for the city of Chicago. The data were obtained from the Northeastern Illinois Planning Commission.

Gender and race: Although African Americans represent only 13% of the U.S. population they account for 40% of the 944,306 AIDS cases diagnosed since the start of the epidemic and approximately half (49%) of the 42,514 cases diagnosed in 2004 alone. The AIDS case rate per 100,000 among African Americans adults/adolescents (72.1) was nearly 10.2 times that of whites (7.1). African Americans accounted for 55% of deaths due to HIV in 2000, and their survival time after an AIDS diagnosis is lower on average than it is for other racial/ethnic groups [10].

There has been a change in the face of AIDS. In 1985 there were 11,000 male cases and 1,000 female cases; however, by 2004 there were 31,000 male cases and 11,000 female cases. African American women account for the far majority of new AIDS cases among women cases (67% in 2004); white women accounted for 17% and Latinas 15% [10]. Among African Americans, African American women represent more than a third (36%) of AIDS cases diagnosed in 2004; by comparison, white women represented 16% of AIDS case diagnosed among whites. Although African American teens (ages 13-19) represent only 15% of the U.S. teenagers, they accounted for 65% of new AIDS cases reported among teens in 2003. Table 1 presents data for the city of Chicago. Appendix A (1) presents data for the U.S. population. For women the AIDS diagnosis rate for the city of Chicago exceeds the national rate. AIDS is the leading cause of death of African American females ages 24-35 [11].

In terms of transmission of the virus male-to-male sexual contact as the means peaked roughly in the mid-1990s at 40,000 went down to slightly under 20,000 by 2004. IV drugs use as a source peaked just a little later at roughly 21,000 reported cases and reduced to roughly 10,000 in 2004. However, heterosexual contact went from a very small number in 1985 to about 12,000 cases in 2004 [1]. Thus, black female population ages 15 to 35 are used as a variable. Data for the total number of this group for each of the 77 community areas is used. It is hypothesized that as the total Black female population increases the number of AIDS death increases. A study in 6 major U.S. cities found that 77% of young gay and bisexual men infected with HIV, ages 15 to 29, including 91% of the African- Americans, did not know they were positive (Kaiser
Analysis was employed as follows:

### Statistical Analysis

Results of the 77 community areas of Chicago is used for the variable.

AIDS cases. As with the other variables, the total AIDS deaths for each is use as one measure of health status of those who are HIV positive/

the AIDS death increase (i.e., directly related).

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assumption is that younger age level of black males is a sufficient proxy

number for each of the respective 77 community areas is used. The

with the major independent variables pertaining to education. The total

black male population ages 15 to 24 are introduced as a control variable

was published in the American Journal of Public Health [13].

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social and economic inequality [2]. The healthcare gap between Blacks

found across a range of clinical settings, including public and private

healthcare in care are associated with higher mortality among minorities. Racial disparities

in health care exist in the context of broader historic and contemporary

economic and social inequality [2]. The healthcare gap between Blacks

and Whites got wider in the city of Chicago. Researchers examined 14

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was published in the American Journal of Public Health [13].

Thus, it is hypothesized that access to health care is a determinant of HIV/AIDS mortality in the city of Chicago. A variable representing

black male population ages 15 to 24 are introduced as a control variable with the major independent variables pertaining to education. The total

number for each of the respective 77 community areas is used. The assumption is that younger age level of black males is a sufficient proxy for health care access and as the total numbers (ages15 to 24) increases the AIDS death increase (i.e., directly related).

HIV/AIDS deaths: This variable is used as a dependent variable. It is use as one measure of health status of those who are HIV positive/ AIDS cases. As with the other variables, the total AIDS deaths for each of the 77 community areas of Chicago is used for the variable.

Results

Statistical analysis

Before conducting the regression analysis some preliminary analysis was employed as follows:

Two sample T-test of the respective means:

Means of sample all HIV deaths 1992 and sample all HIV deaths 2002 are presented below:

HIVD 1992 total cases mean=10.5 standard deviation=16.8 S.E

mean=1.9

HIVD 2002 total cases mean=4 standard deviation=4.78 S.E

mean=0.55

t-test: mean HIVD1992=mean HIVD 2002 vs. not equal

Thus, not equal, the t-value is 3.28 and p=0.0015 with 88 degrees of freedom.

The decrease in the total number of HIV deaths from the year 1992 (some 825) to the year 2002 (some 317) is statistically significant.

A one way analysis (ANOVA) of the preceding sample results in a F-value=3.7 with p=0.0000.

A Kruskal - Wallis test has the following results:

H=45.61 d.f.=15, p=0.000.

After conducting the regression analysis of the independent variables onto the dependent variable, the equation is as follows:

1) HIVD2002=0.070 + 0.00044 ED1 + 0.000004 ED2 + 0.00635

ED3 -0.00053 ED4 -0.00227 ED5 +0.00187 FP +0.1062 BM

R-square=74.8, F-ratio=34.66, p-value =0.0000

2) HIVD 1992= +5.36 + 0.00044 ED1 -0.000081ED2 -0.0307 ED3

+0.0540 ED4 -0.3041 ED5 +0.00163 FP -0.7638

R-square=54.3, F-ratio=13.80, p-value =0.000

The above information can be expressed in tables 2 and 3.

Discussion

In the analysis of the above findings it may be useful to once again draw upon the framework of the public health model. That model incorporates an emphasis on prevention of disease processes. It assumes a natural history of a disease as follows: susceptibility, pre-symptomatic, clinical disease, disability, recovery or death. Accordingly, interventions are primary, secondary or tertiary. Primary interventions entail altering an individual's susceptibility or reducing exposure. Secondary interventions entail early detection and treatment at the pre-clinical and clinical stages respectively. Tertiary interventions address alleviation of

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**Table 1:** AIDS Diagnosis Rates by Year of Diagnosis and Selected Characteristics, Chicago, 1985-2006 (as of 6/30/2008).

| Characteristic                  | Chicago*          | Illinois** | U.S.*** |
|--------------------------------|-------------------|------------|---------|
|                                | 1985   | 1990   | 1995   | 2000   | 2006   | 2006   | 2006   | 2006   |
|                                | No.    | Rate   | No.    | Rate   | No.    | Rate   | No.    | Rate   | No.    | Rate   |
| Sex                            |        |        |        |        |        |        |        |        |        |        |
| Male                           | 214    | 15.0   | 1,039  | 77.8   | 1,316  | 98.6   | 754    | 53.7   | 579    | 44.5   |
| Female                         | 8      | 0.5    | 104    | 7.2    | 296    | 20.4   | 222    | 14.9   | 166    | 11.8   |
| Race/Ethnicity§                |        |        |        |        |        |        |        |        |        |        |
| NH Black                       | 65     | 5.4    | 529    | 49.2   | 968    | 90.0   | 629    | 59.7   | 449    | 47.9   |
| NH White                       | 131    | 10.0   | 444    | 42.0   | 407    | 38.5   | 179    | 19.7   | 145    | 17.7   |
| Hispanic                       | 23     | 5.4    | 161    | 29.5   | 968    | 90.0   | 156    | 20.7   | 129    | 16.6   |
| NH Other/Unknown               | <5     | -      | 9      | 8.6    | 27     | 25.9   | 12     | 6.6    | 22     | 13.2   |
| Total Cases                    | 222    | 14.5   | 1,143  | 71.4   | 1,612  | 84.2   | 976    | 44.9   | 745    | 27.6   |

Note: Use Caution when interpreting data based on 20 or fewer events, the rate/percent is unreliable. Number and rate are suppressed if count is <5.

*NH= Non-Hispanic

*Rate per 2006 population using 2005 population projections.

**Rate per 100,000 population using 2006 US census Bureau Population Estimates.

***Rate per 100,000 populations using 2006 US census Bureau Population Estimates: rates by gender per 100,000 adults/adolescents.

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**Table 2:** AIDS Mortality Rates by Year of Diagnosis and Selected Characteristics, Chicago, 1985-2006 (as of 6/30/2008).

| Characteristic                  | Chicago*          | Illinois** | U.S.*** |
|--------------------------------|-------------------|------------|---------|
|                                | 1985   | 1990   | 1995   | 2000   | 2006   | 2006   | 2006   | 2006   |
|                                | No.    | Rate   | No.    | Rate   | No.    | Rate   | No.    | Rate   | No.    | Rate   |
| HIVD 1992                      |        |        |        |        |        |        |        |        |        |        |
| Total Cases                    | 222    | 14.5   | 1,143  | 71.4   | 1,612  | 84.2   | 976    | 44.9   | 745    | 27.6   |

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**Table 3:** AIDS Mortality Rates by Year of Diagnosis and Selected Characteristics, Chicago, 1985-2006 (as of 6/30/2008).

| Characteristic                  | Chicago*          | Illinois** | U.S.*** |
|--------------------------------|-------------------|------------|---------|
|                                | 1985   | 1990   | 1995   | 2000   | 2006   | 2006   | 2006   | 2006   |
|                                | No.    | Rate   | No.    | Rate   | No.    | Rate   | No.    | Rate   | No.    | Rate   |
| HIVD 2002                      |        |        |        |        |        |        |        |        |        |        |
| Total Cases                    | 222    | 14.5   | 1,143  | 71.4   | 1,612  | 84.2   | 976    | 44.9   | 745    | 27.6   |
According to the 2005 U.S. National Violence Against Women Survey, 1.3 million women were younger than age 12 when they were first raped, and 32 percent were ages 12 to 17 years [14]. The highest rate of HIV/AIDS for Black women comes from sexual intercourse, followed by drug use. Figure 2 gives some of the details. Substance abuse and alcohol abuses are risk factor for non-adherence to ARV treatment. Because a relatively large proportion of black females who carry the disease live in poverty, there is minimal health care, either as prevention measure or maintenance of health with the virus. They are not educated enough on the issues of sex or AIDS, so many are ignorant to the HIV/AIDS virus, along with other Sexually Transmitted Diseases (STD), consequently many times they go undiagnosed. Poverty, discrimination, and possibly the non-adherence of black women to ARV treatment also play an important role in the death rates.

The profession of social work and other behavioral health experts can take the lead in the arena of primary prevention and health promotion. Safe sex or no sex is a matter of individual choice but appropriate education as to the consequences of such choices transcends choice. The profession can help advance access to healthcare, useful instructions from healthcare providers to individuals, families, communities and the overall satisfaction with the healthcare system [15,16]. Finally, regarding tertiary prevention the profession of social work can, for one thing, collaborate with healthcare providers in addressing the needs of those now “living with AIDS.” The AIDS virus can sneak into the brain to cause dementia, despite today’s medicines. NeuroAIDS, which afflicts at least one in five people with HIV and is becoming more common as patients live longer. With almost one million Americans, and almost forty million people world-wide, living with HIV that’s a remarkable jump.

Returning to primary and secondary prevention, the findings indicate that African American females ages 15 to 35 had been highly vulnerable in terms of death rate at the beginning of the period in question and continue to be so 10-years later but at a less challenging rate. Remember this is the case while controlling for education which overall is a plus. It raises issues about the incidence of depression and/or anxiety of some black females when stricken with the virus [5] or as in the case of some diseases the psychological and somatic effects of racism in the society. More research has to be done regarding the nature and social-structural circumstances of the exposure to the HIV virus in this specific population.

Apparent;y, African American females particularly adolescents are being infected through unprotected sexual intercourse, drug use, and interpersonal violence. In the United States, approximately 1.3 million women are physically assaulted by an intimate partner compared to 835,000 men [14]. According to the 2005 U.S. National Violence Against Women Survey, 64 percent of women who reported being raped, physically assaulted, or stalked by a current or former husband, cohabiting partner, boyfriend, or date victimized since age 18. In addition, one in six women has experienced an attempted or completed rape-defined as a forced or threatened vaginal, oral or anal penetration-in her lifetime; and many are raped at an early age [14]. Of the 18 percent of all women surveyed who said they had been the victim of a completed or attempted rape at some time in their lives, 22 percent were younger than age 12 when they were first raped, and 32 percent were ages 12 to 17 years [14].

Table 2: HIV deaths (year 2002) estimates.

| Parameters | Estimates | t-statistics | p-value |
|------------|-----------|--------------|---------|
| ED1        | 0.000574  | 1.18         | 0.241   |
| ED2        | 0.000004  | 0.06         | 0.956   |
| ED3        | 0.000635  | 3.11         | 0.003*  |
| ED4        | -0.00053  | -0.2         | 0.842   |
| ED5        | -0.00227  | -0.77        | 0.442   |
| FP         | 0.00187   | 3.88         | 0.000*  |
| BM         | -0.1062   | 0.99         | 0.32    |

*statistically significant

Table 3: HIV Deaths (year 1992) estimates.

| Parameters | Estimates | t-statistics | p-value |
|------------|-----------|--------------|---------|
| ED1        | 0.00044   | 0.19         | 0.848   |
| ED2        | -0.000081 | -0.25        | 0.8     |
| ED3        | -0.0307   | -3.16        | 0.002*  |
| ED4        | 0.054     | 3.57         | 0.001*  |
| ED5        | -0.0341   | -2.44        | 0.017*  |
| FP         | 0.00163   | 6.79         | 0.000*  |
| BM         | -0.7638   | -1.51        | 0.135   |

*statistically significant

Disability or attempt to restore effective functioning and certainly avoid death as an outcome. At the primary and secondary levels of prevention as it relates to AIDS patients deaths, going back to the results of the study, for the variables pertaining to education, as levels of achievement increased the mortality rates decreased in AIDS deaths in the city of Chicago. Those with a college education went from a highly problematic status at the beginning of the ten-year period to one less consequential, at least statistically. However, the part of the city’s black population with the associate’s degree went from a negative correlation to a positive one over the ten-year period. Given the data it represents an alarming reversal, especially with the overall decline in the deaths associated with the virus. Also, over the ten-year period there was a loss regarding some of the impact that having an advanced degree achieved. It remained inversely related but no longer in a statistically significant manner. Furthermore, it is important to consider that the lower educated groups have moved to a positive (directly) related way. Despite the overall decrease in AIDS related death they are losing ground but certainly not at the pace of those having an associate’s degree. In the United States deaths among African Americans with AIDS declined by 7% between 2000 and 2004 compared to a 19% decline among whites over this period [10].

Figure 2: AIDS cases among female adults and adolescents: 70% are acquired through sexual activity.
activities, but not everyone does. In a vicious cycle, the memory loss makes many forget to use their anti-HIV pills, so the virus rebounds.

Another thing that has to be done is for us to intensify interventions to address the issue of socioeconomic disparities in health. Maybe the overriding explanation lies in the social stress that comes from living in a hierarchical and unequal society. In the face of persistent stress, the continued diversion of resources away from bodily maintenance apparently contributes to cellular damage, organ dysfunction and disease. Those individuals living with AIDS would also present such confounding effects.

Conclusion

The life expectancy gap between blacks and whites in the United States remains both persistent and substantial although there has been some movement since 1993. White women live 4.5 years longer than black women do on average, and white men live 6.3 years longer than black men according to the Journal of the American Medical Association. Since 1993, the gap has dropped to historically low levels, yet homicide, HIV and infant mortality continue to keep the black-white gap unnecessarily large [13]. In this paper we examined the city of Chicago that apparently is coping with the HIV/AIDS crisis in a positive manner.

Education in the black community is part of the solution but that is not a clear-cut answer. An estimated 95,959 (one estimate is 126,000) women were living with AIDS, representing 23% of the estimated 421,873 people living with AIDS in the 50 states and the District of Columbia 2005. More effective public health interventions have to put forth enhances the quality of the women marginalized by the current system [12].

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