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The 2006 National Health Interview Survey data was used to determine which demographic characteristics were associated with disability in Blacks and Whites age 65 and over. The dependent variable was any self-reported disability or limitation. The independent variables were age, gender, insurance status, marital status and education. For Blacks, there was a statistically significant association for reporting a limitation and being female and increased age. A lack of government insurance coverage and having a high school diploma was found to be protective. For Whites, there likewise was an association for a reporting a limitation and age and a protective effect of lacking government insurance. However, education's increasingly protective effect extended to college graduates.

DETERMINANTS OF DISABILITY IN ELDERLY BLACKS AND WHITES, 2006

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CHAPTER I
INTRODUCTION

Rationale

There are more than 37 million United States (U.S.) residents 65 years and older. Over the next 40 years, that number is expected to double while those over age 85 are expected to triple (Administration on Aging, 2008). There were 3.1 million Blacks over age 65 in 2006, and that number is projected to be 10.4 million in 2050, with that group's share of the population growing from 8.3% to 12% (Administration on Aging, 2008). While the elderly population is expected to grow 30% between 2000-2015, the elderly Black population is expected to grow by 50% (U.S. Bureau of the Census, 2001). Black elders represent the fastest-growing segment of the Black population (Wykle & Kaskel, 1994).

According to the 2000 U.S. Census, about 42% of those over age 65 had at least one disability (Waldrop & Stern, 2003). The U.S. Department of Health and Human Services estimates the number of disabled elderly increased from 26.9 million to 34.4 million from 1982 to 2004 because of the rapid growth in this age cohort (U.S. Department of Health and Human Services, 2004), despite the fact that the disability rate has been declining (Cutler, 2001).

There are several measures of disability and one that is used very often between providers are assistance with activities of daily living (ADL) and instrumental activities of daily living (IADL). Activities of daily living include bathing, dressing, eating, toilet use and moving from one room to another. IADLs consist of meal preparation, money

and medication management, telephone use, light housework and food shopping (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963). The ADL and IADL scales are well established in clinical settings, but are less useful measures in the general population because their reliability and validity frequently have been challenged (Reuben, Valle, Hays, & Siu, 1995b; Rodgers & Miller, 1997; Sonn, 1996; Spector, Katz, Murphy, & Fulton, 1987). The World Health Organization (WHO) adopted the International Classification of Function, Disability and Health (ICF), which is considered an international standard in measuring health and disability. The ICF classifies a person's functional performance using a list of activities in his or her daily environment (Centers for Disease Control, 2008a).

A 2002 U.S. Census report on disability estimated the rate of elderly Black disability at 19.8% (with 14% being severely disabled and 4.7% needing assistance Steinmetz, 2006). Compared to Whites, Blacks have more disabilities and live more years with disabilities but do not differ in disability severity (Taylor, 2008). Also, relative health and functional disparities lessen as Blacks and Whites age. A review of several national studies showed that Black disadvantage in health and function narrowed considerably in the oldest old (Gibson, 1991).

There is ample and consistent evidence of Black health disparities compared to Whites. Those disadvantages include higher rates of disability, mortality, longer periods of poor health and chronic disease, and greater likelihood to report fair or poor health (Clark & Gibson, 1997; Gibson, 1994; Hayward & Heron, 1999; Hayward, Myles, Crimmins, & Yang, 2000; Jette, Crawford, & Tennstedt, 1996; Kington & Smith, 1997;

Manton & Stallard, 1997; Pamuk, Makuk, Heck, & Reuben, 1998; Peek, Coward, Henretta, Duncan, & Dougherty, 1997; Williams & Collins, 1995; Zsembik, Peek, & Peek, 2000). Explanations primarily center on evidence that racial minorities are unable to translate socio-economic resources into health because discrimination limits health access and increases stress (Massey & Denton, 1993a; Oliver & Shapiro, 1995; Crimmins, Hayward, & Seeman, 2004; Cagney, Browning, & Wen, 2005).

The Healthy People 2010 definition of health disparities becomes critical to the present study. Health disparities are defined as differences in morbidity and mortality, occurring by gender, race or ethnicity, income level, education level, disability, geographic location, or sexual orientation (U.S. Department of Health and Human Services, 2000). Many of the same disparities and barriers present in younger populations will continue into old age, when access to health care can be even more vital and critical (Trevino & Coustasse, 2007).

These health disparities also apply specifically to elderly Blacks (Bulatao, Anderson, & National Research Council Panel on Race, Ethnicity, and Health in Later Life, 2004; Kington & Nickens, 2001) and Socio-Economic Status (SES) explains most, but not all, of these disparities (Clark & Maddox, 1992; Crimmins et al., 2004; Farmer & Ferraro, 2005; Ferraro, 1987; Kahn & Fazio, 2005; Kington & Nickens, 2001; LeClere, Rogers, & Peters, 1998; Mutchler & Burr, 1991). Recent research has found that SES neighborhood context plays an important role in explaining disparities, as well as individual SES (Balfour & Kaplan, 2002; Cagney et al., 2005; Krause, 1996; Patel, Eschbach, Rudkin, Peek, & Markides, 2003; Robert & Li, 2001; Robert & Lee, 2002;

Robert & Ruel, 2006; Subramanian, Acevedo-Garcia, & Osypuk, 2005; Wen, Cagney, & Christakis, 2005; Yao & Robert, 2008). Even at the same income level as Whites, more affluent elderly Black residents of poorer neighborhoods suffer the same disparities as their poorer neighbors (Jargowski, 1997), providing further evidence of racial disparities at older ages (Cagney et al., 2005; Robert & Lee, 2002; Robert & Ruel, 2006).

Blacks also suffer comparatively greater disability and impaired physical functioning (Mendes de Leon et al., 1995; Mendes de Leon et al., 1997; Mendes de Leon, Barnes, Bienias, Skarupski, & Evans, 2005). ADL racial disparities are explained in part by cognitive status and SES (Moody-Ayers, Mehta, Lindquist, Sands, & Covinsky, 2005). Chronic medical conditions and physical limitations appear to have a greater impact on Black disability (Zsembik et al., 2000) and poor ADL disability trajectory (Li, 2005).

Although Blacks have a greater disability prevalence, the racial disparity decreases with age – especially in women (Mendes de Leon et al., 1995) – and actually reverses between the ages of 75 and 86 (Gibson, 1991; Johnson, 2000; Mendes de Leon et al., 1997). This so-called racial cross-over effect has been studied for decades in mortality and morbidity, as well as in disability. Studies in 1966 and 1971 noted greater prevalence of diabetes and rheumatoid arthritis in Blacks until the rates eventually equalized with that of Whites at age 65 (Adler, Bloss, & Mosley, 1966; Cobb, 1971). A 2000 study identified racial crossover in comorbidity at age 76, advanced ADL disability at age 86 and mortality at age 81 (Johnson, 2000).

Gibson (1991) found worse health and functioning among Blacks age 65-74 than those age 75-79, and a decreased ADL disability in blacks age 85 and older. A possible explanation may be adverse mortality selection, which claims the lives of the less healthy and more disabled while leaving behind the healthy and functional (Manton, Patrick, & Johnson, 1987).

Two other life-course hypotheses have been advanced regarding SES and racial disparities: cumulative disadvantage and double jeopardy. The cumulative disadvantage hypothesis posits that lifetime SES inequalities accelerate because of greater exposure to risk factors associated with SES as well as more limited access to protective factors such as health care resources (O'Rand, 2002). The double jeopardy hypothesis specifically refers to the compounded disadvantages bestowed by advancing age as well as racial minority status (Brown & Lynch, 2004; Ferraro, 1987).

While racial disparities are researched continuously and robustly, relatively scant attention has been paid to the factors that contribute to intra-racial health and disability disparities. Besides age, gender and SES influences (Smith & Kington, 1997), differences among older Black adults have been found in diet (Kumanyika & Odoms, 2001), personal health behaviors (Berkman & Mullen, 1997) and race-related identity (Thompson, Kamarck, & Manuck, 2002) and discrimination (LaVeist, Sellers, & Neighbors, 2001).

Manuel (2000) argues that what is known about Black aging is based largely on the assumption that a racial-group label preordains one's history, culture and social experience. Other researchers (Jackson, 1988; James, 1984; Markides, Liang, & Jackson,

1990; Myers, 1984) have questioned the propriety and validity of inter-racial comparisons of SES and other sociocultural factors such as occupation, lifestyle and coping resources. Further, for multiple indicators of health status, differences in SES in each racial group were greater than those between the races (Navarro, 1989; Williams, 1999).

Purpose

There has been a paucity of research on Black intra-racial disability. Inevitable funding limitations dictate that policy solutions be targeted to the more significantly at-risk groups. This research is designed to examine disability risks based on demographics other than race. This focus should highlight Black subgroups at greatest risk of disability, using the most recent data available. Elected officials tend to define problems racially out of simplicity and because Blacks represent a powerful voting bloc.

Although there has been limited research exclusively on disability in elderly Blacks, it has almost always been analyzed in the context of racial disparities. This research will provide a comprehensive examination of numerous factors associated with Black disability.

Research question

Which of the following characteristics are associated with higher levels of disability in Blacks and Whites: age, gender, insurance status, martial status and/or education?

CHAPTER II

LITERATURE REVIEW

Nagi's disability model

Nagi's seminal work (1965) in understanding disability centered on what he considered imprecision and overlap in terminology. His model identified active pathology (the disease process), impairments (physiological abnormalities), functional limitations (impaired performance of daily activities), and disability (long-term impairment) (Nagi, 1965).

International Classification of Impairments, Disabilities, and Handicaps (World Health Organization, 1980)

The World Health Organization (WHO) issued the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) in 1980 to clarify the distinctions between impairment, disability and handicap. The WHO outlined the pathway from disease-induced impairment (organ and body dimension) to disability (individual dimension) and, finally, handicap (social dimension) (World Health Organization, 1980). A 2004 revision led to the creation of the International Classification of Functioning, Disability, and Health (ICF) (WHO, 2004) to complement the International Classification of Diseases (ICD-10) (World Health Organization, 2004).

The disablement process

A popular socio-medical conceptualization of the disability process was developed by Verbrugge and Jette (1994), based on Nagi's original concepts. The process attempts to describe how health conditions affect specific body systems, physical and cognitive limitations, daily activities of life and the impact of risk factors. They identified four sequential stages: (1) pathology (disease) acquisition; (2) physical or mental impairments; (3) functional limitations, and (4) disability. Ideally, identifying risk factors during the process, and clarifying and mitigating their impact, will offer an opportunity to reduce and prevent disability (Lawrence & Jette, 1996). Using this framework, researchers found that functional limitations were the major correlates of disability in U.S. Whites, Hispanics and Europeans (Femia, Zarit, & Johansson, 2001; Lawrence & Jette, 1996; Peek, Patel, & Ottenbacher, 2005; Peres, Verret, Alioum, & Barberger-Gateau, 2005).

Definition of disability

Most surveys are fairly consistent in defining dependence as ADL or IADL limitations (Cutler, 2001). But there is controversy over how best to assess disability. Some researchers define disability as needing ADL assistance (Ferrucci et al., 2000; Gill, Williams, & Tinetti, 1995; van den Brink et al., 2003), and others impose a minimum time period such as 90 days (Cutler, 2001). Others consider disability as difficulty performing ADLs (Femia et al., 2001; Langlois et al., 1996; van Gool et al., 2005). While need and dependence are related, need is more indicative of dependency and need for health services, while difficulty equates more to quality of life (Reuben, Valle, Hays, &

Siu, 1995a). Gill, Robison and Tinelli (1998) expressed the difference as a continuum of care, with independent elderly with no ADLs need the fewest health services, those who are ADL dependent needing the most services, and those who are independent but with difficulties between the extremes.

But the inconsistencies were significant enough that a panel of experts was convened in 2002 to reconcile the differences in five national data sets to determine disability trends between 1980-2000 (Freedman et al., 2004).

Another study identified five different definitions of disability and compared the health-care expenditures for each group. Researchers found disability prevalence differed dramatically based on the definition, and the resulting range of estimates of expenditures reflected more than a three-fold difference (Tepper, Sutton, Beatty, & DeJong, 1997).

Cutler (2001), in seeking to discern disability trends, defined his disability pathway as pathology (cellular or tissue change by disease or infection); impairment (loss or abnormality in physical or mental function); functional limitation (inability to perform specific tasks); dependence (health difficulty in undertaking typical activities). To Cutler, a functional limitation in something that is not expected to be performed does not lead to dependence. Dependence, on the other hand, is specific to ADLs and IADLs. Cutler considers one with a functional limitation or dependent to be disabled.

Self-assessed health

Self-assessed health reflects a respondent's subjective evaluation of general well-being and quality of life. It is also referred to as perceived health (Johnson & Wolinsky, 1993), subjective health (Drevenstedt, 1998; Musick, 1996), assessed health (Ferraro &

Farmer, 1996), and self-rated health (Frankenberg & Jones, 2004; E. Idler, 2003; McDonough & Amick, 2001). While not an objective measure of absence of disease, it has been found to be unbiased regarding gender-specific conditions, valid across racial and ethnic groups and useful for analyzing disparities over time (Ross & Bird, 1994; Ferraro & Farmer, 1996; Chandola & Jenkinson, 2000).

A strong association has been established between poor self-assessed health and functional ability (Farmer & Ferraro, 1997; Idler & Kasl, 1995; Idler, Russell, & Davis, 2000) and physical disability (Rakowski & Cryan, 1990; Whitelaw & Liang, 1991). Among those age 65 or older with a severe disability, 66% reported fair or poor health – compared to 10.5% of those in the same age group who had no disability (Administration on Aging, 2006).

Contrary to earlier research, Schnitter (2007) established that women's self-assessed health has improved to the point that there was no significant gender difference. SES is also a reliable predictor of self-assessed health, with lower levels of income and educational attainment being strongly associated with fair or poor reported health (Cummings & Jackson, 2008). Elderly Blacks have a greater decline in self-rated health than whites over time based on individual and neighborhood SES (Yao & Robert, 2008). Of Blacks who reported at least one disability, 46.6% rated their health as fair or poor, compared to 36.9% of Whites (CDC, 2008b).

In 2005, about 61% of Black men and 58% of Black women reported excellent or good health. Positive health evaluations decline with age. In 2005, for example, 62% of

Black women age 65-74 reported excellent or good health, compared to 43% among those 85 and older (Administration on Aging, 2008).

Socioeconomic Status

SES generally refers to one's position within a social structure that determines access to power, privilege and resources (Cummings & Jackson, 2008). Better health is associated with higher SES, typically measured by education, occupational prestige, income and net worth, and insurance coverage (J. Lynch & Kaplan, 2000). Whites have higher SES levels than Blacks, and men are more advantaged than women (Bauman & Graf, 2003; Fronczek & Johnson, 2003; Welniak & Posey, 2005), with Black women occupying the lowest rung on the SES ladder (McKinnon, 2003).

A strong association has been well established between low SES and higher rates of disease, impairment, disability and earlier loss of functioning (Clark, Maddox, & Steinhauser, 1993; Clark & Maddox, 1992; Guralnik & Kaplan, 1989; Guralnik, Land, Blazer, Fillenbaum, & Branch, 1993; Keil et al., 1989; Mendes de Leon et al., 1995; Mutchler & Burr, 1991; Rogers, Rogers, & Belanger, 1992; Strawbridge, Kaplan, Camacho, & Cohen, 1992; Williams & Collins, 1995), and has often accounted for most of the racial differences in functional health (Mendez 1995; Clark 1992; Guralnik 1993; Mutchler 1991).

Most prospective studies have identified older Blacks as being at higher risk for disability either because of SES or health-related factors (Clark & Maddox, 1992; Ford, Haug, Jones, Roy, & Folmar, 1990; Rogers et al., 1992; Strawbridge et al., 1992). Minority and socio-economically disadvantaged elderly are as much as three times more

likely than other groups to experience disability (Freedman & Martin, 1998; Freedman, Aykan, & Martin, 2001; Manton & Gu, 2001b). Compared to those without disability, they have three times more medical expenditures (Trupin, Rice, & Max, 1996).

A 2005 study using data from the 1982-2002 NHIS surveys showed declining self-reported disability among all SES and ethnic groups. However, the average annual percent declines were the smallest for the most disadvantaged SES groups – and actually increased for the lowest income and education groups – indicating that SES disparities increased during those two decades (Schoeni et al., 2005).

A recent study found functional limitation in Americans between ages 55 and 84 was inversely proportional to social class, with those below the poverty line at younger ages six times more to report a limitation compared to those 700 percent above the poverty line (Minkler, Fuller-Thomson, & Guralnik, 2006). And there is evidence that SES-associated health disparities are increasing (Mensah, Mokdad, Ford, Greenlund, & Croft, 2005; Pappas, Queen, Hadden, & Fisher, 1993; Shi & Stevens, 2005).

The 2006 median household income headed by an elderly Black person was \$30,755, compared to \$39,649 for all U.S. elderly households. The median personal income for Black men was \$15,731 and \$11,062 for Black women, compared to \$23,500 for all elderly men and \$13,603 for all elderly women. The 2006 poverty rate for elderly Blacks was 23%, compared to 9.4% for all elderly. The Black poverty rate in 1965 was 65% (Administration on Aging, 2008).

Education does not translate into income and wealth as effectively for Blacks compared to Whites (Shuey & Willson, 2008). Lynch (2006) found the effect of education on health is largely the result of income that it produces. And if Blacks are able to produce comparable income and wealth, then they can produce equal success to Whites in good health.

For the elderly, wealth may be a better measure of economic resources than income because investment income from accumulated assets is an important component of long-run income (Smith & Kington, 1997). Racial differences in wealth are far greater than in education and income. Among college graduates, Whites hold four times the net worth of Blacks (Conley, 1999; Keister & Moller, 2000; Oliver & Shapiro, 1995).

However, the health-wealth gradient has been found to be even steeper among Blacks, with male and female respondents reporting poor health having a median net worth of \$2,000 and \$23 respectively, compared to those reporting excellent health having a median net worth of \$72,500 and \$69,075, respectively (Smith & Kington, 1997).

SES is often referenced in racial-disparity studies, with many studies discounting race when SES variables are introduced (Kahn & Fazio, 2005). Or when SES is controlled, racial health differences in mortality and functional limitations are often eliminated (Kington & Smith, 1997). Yet it is difficult to separate race and SES because they are inexorably linked (Hummer, 1996). Conversely, Black men appear to garner greater health gains with improved SES while Black women have lower returns compared to Whites (Cummings & Jackson, 2008). Indeed, the highest SES group of

Black women has equivalent or higher rates of infant mortality, low birth weight, hypertension and excess weight compared to the lowest SES group of White women (Pamuk et al., 1998).

Gender

Elderly women suffer higher rates of arthritis-related disability than men, resulting in more difficulty performing ADLs and IADLs (L. M. Verbrugge, 1995). More specifically, Black women were twice as likely as Whites to report knee osteoarthritis (J. Anderson & Felson, 1988). Diabetes is also associated with physical disability, especially during the late progression of the disease (Gregg et al., 2000). Diabetes mellitus is much more prevalent for Blacks than Whites (Brancati, Whelton, Kuller, & Klag, 1996; Wray, Alwin, Manning, & Best, 2006), and Black women suffer higher rates than Black men (Robbins, Vaccario, Zhang, & Kasl, 2000). In five waves of the National Long Term Care Survey from 1982 to 1999, Arbeev et al. (2004) found that Black women had a far higher ADL disability prevalence (22-27%), compared to White women (16-18%), the second-highest group. Black women are more than twice as likely to report at least one personal care disability as Black men (Manuel & Smith, 2004).

Black women are especially burdened by obesity, as well as a higher propensity to be severely obese (Clark & Gibson, 1997). Only 20-25% of all elderly Blacks report regular exercise (Kumanyika, 1997). Manuel and Smith (2004), who report that two times more obese Black elderly than non-obese report activity and personal-care limitations, say weight control and physical activity stand out as the most important behavioral factors for health production in older Blacks.

Despite these gender disparities, Black women have made significant strides in closing the gap because of a sharp escalation in workforce participation since the 1970s (Schnittker, 2007). Yet they continue to suffer the greatest health burden of either race or gender (Geronimous, 1996).

Marital status

Research has consistently established marriage as a health advantage. Those who are married are happier and more satisfied with life (Jackson, 1997), experience fewer chronic conditions (Waite, 1995), and live longer (Lillard & Panis, 1996; Rogers, 1995). Married individuals may participate in more health-promoting behaviors and may tend to be integrated socially. According to some scholars, marriage provides a number of important and substantial benefits, including a healthier life style, increased income and wealth, and a major source of emotional and instrumental support (Waite, 1995; Lillard & Panis, 1996). Conversely, divorce often leads to declines in self-assessed health (Williams, 2004).

In 2006, 52% of elderly Black men lived with their spouses, 22% lived with relatives or friends and 26% lived alone. By comparison, 23% of elderly Black women lived with their spouses, 36% lived with relatives or friends and 41% lived alone (Administration on Aging, 2008).

Chronic conditions

Most elderly Blacks have at least one chronic condition, and many have co-morbidities. Blacks suffer higher rates of hypertension (58%) and diabetes (23%) compared to the general elderly population (48% and 16%, respectively). Other

prevalence rates include: arthritis, 46%; heart disease, 22%, and cancer, 12% (Administration on Aging, 2008). The most important chronic conditions that lead to disability are arthritis, stroke, heart disease and diabetes (Guccione, Felson, & Anderson, 1994).

However, a 2000 study attributed excess disability among elderly Blacks to higher levels of cognitive limitation. The study also found that medical conditions and physical limitations had a larger impact in disability acquisition for Blacks and Hispanics than Whites (Zsembik et al., 2000).

Health Insurance

Medicare has played a critical role in mitigating racial and SES disparities in health care access among older Americans, and is especially important for the disabled. Equipment assistance is available through Medicare's Durable Medical Equipment (DME) benefit, which paid \$7.7 billion in 2003 (MedPAC, 2005). Among the devices covered for by the benefit that are useful to those with ADL limitations: walkers; wheelchairs; crutches; bed pans; seat lifts; canes; traction equipment; commodes; hospital beds; seat, and patient lifts. With the proper approval, the DME benefit pays 80% of the equipment cost after the deductible. The remaining 20% can be covered by Medicaid, supplemental insurance or self-pay (Iwashyna & Christie, 2007).

But lower-income beneficiaries may still be reluctant to utilize these services that could improve functional status because of Medicare's deductibles, co-payments and uncovered services (Chernew, Goldman, Pan, & Shang, 2005). In 2006, 44% of elderly blacks had Medicare and supplemental insurance, compared to 56% of all elderly

(Administration on Aging, 2008). Supplemental insurance has been found to be protective of disability onset, lowering the risk by 28% even after controlling for SES (Taylor, 2008).

Education

Education is an important explanatory variable in exploring the SES-health relationship. Schooling is a critical determinant of economic status because it generally leads to higher lifetime earnings. It is also an efficient producer of health because educated consumers tend to make better nutritional and lifestyle choices that lead to healthier lives (Smith & Kington, 1997).

There is ample research that education has a protective effect against disability. Those with less than 12 years of education have a three-fold greater prevalence in physical vulnerability – disease, disability and mortality – than those with 16 or more years of education (Clark, Stump, Miller, & Long, 2007). Researchers theorize that many IADL tasks, such as managing finances and medications, require a significant amount of cognitive ability, and that education builds and maintains cognitive reserves (Carrasquillo, Lantigua, & Shea, 2000; Keddie, Peek, & Markides, 2005).

Elderly Blacks have made significant strides in education attainment in the past 40 years. In 2006, more than 55% completed high school, compared to 9% in 1970, and 11% had a bachelor's or advanced degree (Administration on Aging, 2008).

Manton and Gu (2001) specifically drew direct links between the increased in education attainment and the decrease in Black disability between 1982 and 1999 (Manton & Gu, 2001a).

However, gains in education do not always translate into health benefits for Blacks and may, in fact, offer additional stress. For example, several studies of SES show the suicide rate for Whites is inversely related to SES while it is positively related to SES in Black men (Williams, 2003). The personal experience of racism may seem especially insulting for those of higher education and SES status who believe they have earned the right not to suffer such indignity (Jackson & Williams, 2006).

Discrimination creates stress that can affect mental and physical health (Jackson, Thoits, & Taylor, 1995; Krieger, 1999; Williams, Neighbors, & Jackson, 2003). There is an association between perceived discrimination and education among Blacks, and Black men report more consistent and acute discrimination than Black women (Forman, Williams, & Jackson, 1997). Unfulfilled expectations of income following education attainment also fuel stress and alienation among Black men (Anderson, 1999). Cummings and Jackson (2008) found that Black men and women actually experience lower returns on health as education increased.

This phenomenon is explored by those who advance what is known as the intersectionality paradox (Mullings, 1997). The theory attempts to explore the simultaneous effect of race, class and gender on health (Schulz & Mullings, 2006). For example, professional Black women must navigate organizations that are divided by race and gender (Cummings & Jackson, 2008). There is growing evidence that Black social

class position does not translate into a lifestyle generally expected of one with a higher socioeconomic status (Cose, 1993; Massey & Denton, 1993b; Williams & Umberson, 2004). The resulting feelings of rejection are considered by some to be important contributors to health and well-being (Keyes, 1998).

One theory points to the possible disparity in education quality rather than quantity. Schools reflect the SES of their neighborhoods (Darling-Hammond & Post, 2000). Those in disadvantaged neighborhoods may be overcrowded, lack an adequate number of books, supplies, computers and laboratory equipment, and are less likely to offer advance placement courses than wealthier schools (Kane, 1999; Lucas, 1999). The teachers tend to be paid less, and are less trained and experienced – leading to a poor educational experience for students (Darling-Hammond & Post, 2000).

Inequality in educational opportunities gives rise in part to the cumulative disadvantage hypothesis, which argues that lifetime SES health inequalities increase as a result of greater exposure to risk factors and less access to protective factors such as health care access and education (O'Rand, 2002). Double jeopardy, a complementary life-course hypothesis, focuses more on racial differences in health over a lifetime in explaining disparities later in life because of the double disadvantage of age and race (Brown & Lynch, 2004; Ferraro, 1987).

CHAPTER III

METHODOLOGY

The study compared proportions of self-reported disability and functional limitation among Black demographic subgroups to Whites based on data from a sample of adults aged 65 and older in the 2006 National Health Interview Survey (NHIS).

The NHIS data were collected in person by U.S. Census interviewers. For a sample adult questionnaire, one adult was randomly selected per household and responded personally to the pertinent questions. If physically or mentally unable to do so, the respondent was allowed to use another person to answer the questions.

Data collection involved a complex, multistate sample design using stratification, clustering and oversampling of population subgroups. The data were weighted and adjusted to calculate valid estimates of the noninstitutionalized U.S. population. Excluded institutions included nursing homes and prisons (U.S. Department of Health and Human Services, 2007). An estimated 4,600 Blacks 65 and older, compared to 10,900 whites, were incarcerated in U.S. prisons. About 225,000 Blacks resided in nursing homes in 2006, compared to about 1,471,000 Whites (Bureau of Justice Statistics, 2007; U.S. Bureau of the Census, 2007).

In the 2006 data, the survey oversampled Black and Hispanic populations for greater precision in estimation of their health characteristics. Prior to interviewing, one part of the sample was assigned to be screened and the interview would continue if the household contained at least one or more Black, Asian or Hispanic residents. The sample

adult selection process also was revised to double the chance that Blacks, Hispanics or Asians over 65 would be included if they were present.

The dependent variable was a recoded summary variable that indicated household members who reported any limitation regarding one or more of the activities discussed during the interview, including ADLs and IADL disabilities, memory impairments, inability to walk without equipment or limitations in working or playing.

To determine ADL disability, the NHIS questionnaire asked: “Because of a physical, mental, or emotional problem, {do/does} {person} need the help of other persons with personal care needs, such as eating, bathing, dressing, or getting around inside this house?” To determine IADL disability, the questionnaire asked: “Because of a physical, mental, or emotional problem, {do/does} {person} need the help of other persons in handling routine needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?”

Independent variables included race, gender, age, education, marital status and insurance status.

Common age and education cohorts were used in the analysis. The NHIS age classification of 65 years and older was divided into three age intervals: 65-74; 75-84, and 85 and above. Education levels consisted of six categories: never attended high school; attended some high school; high school graduate; attended some college; college graduate, and graduate or professional degree. Marital status was inclusive of living arrangements. Categories included married, with spouse living in the household; married

with spouse not living in the household; single, previously married, including widowed, divorced or separated; never married, and living with a partner.

Insurance coverage included Medicare; Medicare Part D; Medicaid; single-service plan; private health insurance; state-sponsored health plan, and other government insurance. Military insurance coverage was excluded after analysis found no significant association with disability status. Household income was excluded from the analysis because 89.6 percent of sample respondents declined or failed to answer the question. The analysis relied on the education and Medicaid variables as proxies for socioeconomic status. The variables were recoded to categorize “don’t know” responses into missing values.

Disability proportions were calculated by restricting the analysis to the disability of interest and computing the percent of respondents, out of all the subgroup respondents, reporting this disability. The chi-square statistic was used to assess the significance of differences in these bivariate comparisons.

The analysis also employed logistical regression due to the categorical nature of the data. Separate regressions were performed for Whites and Blacks. Logistical regression is used when the dependent variable is dichotomous, or one that can assume only one of two mutually exclusive values. Logistic regression can be used to predict a dependent variable based on continuous or categorical independent variables, or both; or to determine the variance in the dependent variable based on the independent variables.

Odds ratios were used to explain the impact of predictor values. Logistic regression estimated likelihood after transforming the dependent variable into a logit variable by estimated the odds of the occurrence of any limitation.

Statistical significance was assessed at the 0.05 level. All statistical analyses were conducted with SPSS version 15. By using SPSS, there was no adjustment for the sample design in the standard error.

CHAPTER IV

RESULTS

Sample description

The results in Table 1 show there were 8390 respondents age 65 and over in 2006 NHIS sample. Women represented 56.7% of the sample, reflecting that gender's longer life expectancy. About 56.5% of respondents were married and living with their spouses, compared to 37.8% who were widowed, divorced or separated.

A total of 98.8% had health insurance coverage. The dominant coverage types were Medicare (94%) and private insurance (53.4%) to either supplement or supplant Medicare. Only 8.7% qualified for Medicaid coverage, which supplements Medicare premiums and co-payments. A total of 29.4% never graduated from high school, compared to 17.6% who earned college or post-graduate degrees. The largest proportion (33.5%) had graduated from high school but did not attend college.

Table 1: Sample description		
Variable	n	%
Marital status		
Married, spouse in HH	4683	56.5
Married, spouse not in HH	85	1.0
Single, previously married	3133	37.8
Never married	296	3.6
Sex		
Male	3629	43.3
Female	4761	56.7
Limitations		
Help with personal care	545	6.5
Help with bath/shower	432	5.1
Help with dressing	334	4.0
Help with eating	141	1.7
Help with rising	271	3.2
Help with toileting	209	2.5
Help with mobility at home	251	3.0
Help with routine needs	981	11.7
Unable to work	1135	13.5
Difficulty walking w/o equip.	1431	17.1
Difficulty with memory	631	7.5
Limited in any way	2691	32.5
Limited by chronic condition	2691	32.3
Insurance coverage		
Has coverage	8219	98.8
Medicare	7786	94.0
Medicare Part D	2560	35.3
Medicaid	721	8.7
Single service plan	1511	18.1
Private health insurance	4441	53.4
State-sponsored health plan	57	.7
Other government program	18	.2
Military health care	573	6.9
Education		
Never attended H.S.	1182	15.0
Some H.S.	1161	14.4
H.S. graduate	2676	33.5
Some college	1565	19.6
College graduate	884	10.6
Graduate, professional degree	558	7.0

Comparisons by race

The 6704 Whites and 1153 Blacks comprised 93.6% of the total sample (Table 2). The balance was recoded as “Other” and not included in this comparative analysis. Women were a larger proportion of the Black sample (60.3%, $p = .025$) than Whites (56.3%). Whites were more likely to be married and living with their spouse (58.9% vs. 39.1%, $p < .0001$) while Blacks were more likely to be widowed, divorced or separated (50.5% vs. 36.2%). The age 65-74 proportion of Black respondents was larger (61.9% vs. 53.1%, $p < .0001$). A much larger proportion of Blacks (46.3%, $p < .0001$) than Whites (26.4%) failed to graduate from high school while more than twice as many Whites (11% vs. 4.6%) earned a college degree. Almost three times the proportion of Blacks (17.3% vs. 6.2%, $p < .0001$) have Medicaid coverage. More Blacks reported any limitation (41.2% vs. 32.6%).

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Table 2: Independent and dependent variables by race					
Variable	Whites	Blacks	Other	Chi-Square	P-value
Sex				7.382	.025
Males	2929	458	242		
%	43.7	39.7	45.4		
Females	3775	695	291		
%	56.3	60.3	54.6		
Marital status				197.536	<.0001
Married, living w/ spouse	3910	439	334		
%	58.9	39.1	63.5		
Married, not living w/ spouse	58	15	12		
%	.9	1.3	2.3		
Single, previously married	2402	567	164		
%	36.2	50.5	31.2		
Never married	203	79	14		
%	3.1	7.0	2.7		
Living with partner	64	23	2		
%	1.0	2.0	4.0		
Medicare	6317	1051	418	145.089	<.0001
%	95.2	92.3	82.3		
Medicaid	415	196	110	256.784	<.0001
%	6.2	17.3	21.0		
Military insurance	483	55	35	8.810	.012
%	7.3	4.8	6.7		
Education				275.276	<.0001
Never attended H.S.	845	228	109		
%	13.2	21.3	22.1		
Attended some H.S.	849	267	45		
%	13.2	25.0	9.1		
H.S. graduate	2224	319	133		
%	34.6	29.8	27.0		
Some college	1338	157	70		
%	20.8	14.7	14.2		
College graduate	704	49	91		
%	11.0	4.6	18.5		
Graduate, prof. degree	464	49	45		
%	7.2	4.6	9.1		
Age				50.165	<.0001
65-74	3561	714	339		
%	53.1	61.9	63.6		
75-84	2362	333	156		
%	35.2	28.9	29.3		
85+	781	106	38		
%	11.6	9.2	7.1		
Any limitation	2179	473	144	42.409	<.0001
%	32.6	41.2	27.2		

Characteristics of respondents by limitation status

Table 3 shows respondents reporting any limitation increased with age. Only 25.7% of those age 65-74 reported any limitation ($p < .0001$), compared to 62.4% of those age 85 and over.

Only 26.7% ($p < .0001$) of those married and living with their spouses reported any limitation, compared to 42.5% of those who were single and previously married and 44.4% of those who were never married.

More of those covered by Medicare reported a limitation than those without such coverage (34.5% vs. 20.8%, $p < .0001$). The same trend was noted with those who had Medicaid coverage (56.7% vs. 31.4%, $p < .0001$) compared to those without Medicaid.

Reported limitations also decreased with increasing levels of education. Those who did not attend or graduate from high school (44.3% and 41.8%, $p < .0001$) reported the highest limitation rates, followed by those with a high school diploma or some college (31% and 32.3%). Those with college and post-graduate degrees (25.5% and 21.5%) reported the lowest proportions.

Table 3: Characteristics of respondents by limitation status						
Variable	Any Limitation		No Limitation		Chi-Square	P-value
	n	%	n	%		
Sex					22.040	<.0001
Male	1110	30.6	2512	69.4		
Female	1686	35.5	3059	64.5		
Marital status					228.020	<.0001
Married, living w/ spouse	1248	26.7	3422	73.3		
Married, not living w/ spouse	33	38.8	52	61.2		
Single, previously married	1330	42.5	1797	57.5		
Never married	131	44.4	164	55.6		
Living with partner	27	30.3	62	69.7		
Medicare					38.945	<.0001
Coverage	2675	34.5	5088	65.5		
No coverage	104	20.8	395	79.2		
Medicaid					189.062	<.0001
Coverage	408	56.7	311	43.3		
No coverage	2378	31.4	5195	68.6		
Military insurance					1.175	.278
Coverage	204	35.7	368	64.3		
No coverage	2582	33.4	5138	66.6		
Education					166.199	<.0001
Never attended H.S.	523	44.3	658	55.7		
Attended some H.S.	485	41.8	674	58.2		
H.S. graduate	828	31.0	1842	69.0		
Some college	506	32.3	1059	67.7		
College graduate	214	25.5	625	74.5		
Graduate, prof. degree	120	33.6	438	66.4		
Age					485.561	<.0001
65-74	1181	25.7	3421	74.3		
75-84	1039	36.6	1803	63.4		
85+	576	62.4	347	37.6		

Logistical regression

Logistical regression, using any limitation as the dependent variable, was performed separately for Blacks and Whites (Table 4) since all of the independent and dependent variables were significantly different between those two groups (see Table 2).

For Blacks, there was a statistically significant association for being female and having any limitations (Odds Ratio = 1.358, $p = .041$) and age (OR = 3.968, $p < .0001$ for age 75-84 and OR = 2.646, $p < .0001$ for age 85+). Lack of government insurance coverage was found to be protective (OR = .552, $p = .032$ for Medicare and OR = .291, $p < .0001$ for Medicaid). Either attending or graduating from high school also had a protective effect (OR = .471, $p = .043$ for some high school and OR = .360, $p = .005$ for high school graduate). However, higher levels of education were not significant.

Marital status and collegiate education did not have a statistically significant effect on limitations for Blacks. The analysis' predictive value (percent of cases predicted correctly) for any Black limitation is 68.1%.

For Whites, there was a statistically significant association for age (OR = 4.256, $p = .000$ for age 75-84 and OR = 2.732, $p = .000$ for age 85+). Insurance coverage was protective (OR = .564, $p < .0001$ for Medicare and OR = .395, $p < .0001$ for Medicaid). Increasing levels of education were also protective through college graduation (OR = .489, $p < .0001$ for some high school; OR = .503, $p < .0001$ for high school diploma; OR = .645, $p = .001$ for some college, and OR = .584, $p < .0001$ for a college degree).

Table 4: Logistic regression of Any Limitation for Black and White Samples						
Blacks						
					95% CI for Exp (B)	
Variable	B	S.E.	Sig.	OR	Lower	Upper
Gender						
Female	.306	.149	.041	1.358	1.013	1.820
Marital status						
Married, not in HH	-.182	.527	.730	.834	.297	2.340
Single, prev. married	.409	.837	.625	1.505	.292	7.759
Never married	-.207	.527	.695	.813	.289	2.286
Living with partner	-.164	.578	.777	.849	.273	2.637
Insurance						
Medicare	-.594	.288	.039	.552	.314	.971
Medicaid	-1.236	.189	.000	.291	.200	.421
Age						
75-84	1.378	.263	.000	3.968	2.370	6.642
85+	.973	.273	.000	2.646	1.551	4.515
Education						
Some high school	-.753	.372	.043	.471	.227	.976
High school graduate	-1.023	.366	.005	.360	.176	.736
Some college	-.382	.364	.294	.682	.334	1.394
College graduate	-.179	.386	.642	.836	.393	1.780
Graduate/prof. degree	.106	.486	.828	1.112	.429	2.884
Whites						
					95% CI for Exp (B)	
Variable	B	S.E.	Sig.	OR	Lower	Upper
Gender						
Female	-.102	.061	.092	.903	.802	1.017
Marital status						
Married, not in HH	.062	.294	.833	1.064	.598	1.895
Single, prev. married	-.392	.412	.341	.676	.302	1.514
Never married	-.324	.296	.274	.724	.405	1.292
Living with partner	-.595	.330	.071	.552	.289	1.052
Insurance						
Medicare	-.572	.153	.000	.564	.418	.761
Medicaid	-.928	.116	.000	.395	.315	.496
Age						
75-84	1.448	.090	.000	4.256	3.571	5.073
85+	1.005	.090	.000	2.732	2.289	3.260
Education						
Some high school	-.716	.140	.000	.489	.371	.643
High school graduate	-.687	.139	.000	.503	.383	.661
Some college	-.438	.127	.001	.645	.503	.827
College graduate	-.538	.132	.000	.584	.451	.756

Graduate/prof. degree	-.251	.147	.087	.778	.583	1.037
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Gender, marital status and post-graduate education did not have a statistically significant effect for whites. The analysis' predictive value for any White limitation is 70.3%.

CHAPTER V

DISCUSSION AND CONCLUSIONS

For Blacks and Whites, increasing age and lower levels of education are associated with having any limitation. For Blacks, women are at greater risk of disability than men. Not having Medicare or Medicaid has a protective against having a disability.

Because there was an insufficient sample to use household income as an independent variable, education attainment and having Medicaid coverage were markers for SES. Education attainment's effect on health largely is the result of the income it produces (Lynch 2006). As such, this analysis agrees with many other studies that establish a strong association between SES and higher rates of disease, impairment and disability. Manton and Gu (2001) established an inverse relationship between education attainment and disability. However, my analysis corroborates previous research (Shuey & Wilson, 2008) that education may not translate into health as well for Blacks. My results show that education's protective effect levels off at high school graduation for Blacks while further attainment for Whites continues through college graduation.

The finding that being a Black woman is associated with having any limitation likely reflects that group's higher obesity burden (Clark & Gibson, 1997) and earlier research that obese Black elderly reported twice as many activity and personal-care limitations as those who were not obese (Manuel & Smith, 2004). Specifically, older Black women are more likely to develop arthritis than their White counterparts largely because of their larger prevalence obesity, according to a study of more than 146,000

post-menopausal women in the Women's Health Initiative, in which 57.9% of Black women were obese compared to 32.9% of White women (Wright, Riggs, Lisse & Chen, 2008).

Medicare generally has been credited with helping to narrow health disparities. Only 6% in this analysis did not have Medicare coverage. The lack of Medicare could reflect the fact that those over 65 were still working and received private insurance through their employers. This also may account for the likelihood that those employed over age 65 have few or no mental or physical disabilities.

The protective effect of not having Medicaid means those with incomes high enough not to qualify for the insurance are only 29.1% as likely to have a limitation. Conversely, a 2007 health tracking survey of 13,500 adults showed that those with low incomes, less education, Medicaid enrollees and those with poor self-reported health were less engaged with their health, resulting in unmet need for medical care and less rigorous chronic-disease self-management (Hibbard & Cunningham, 2008). Kaplan and colleagues also found that the fewer than 10 percent of those age 65-85 who "thrived" physically and emotionally were free of chronic illness and had incomes of more than \$30,000 annually – well above Medicaid eligibility in any state (Kaplan, et al., 2008).

The Black population age 65 and older is expected to grow from 3.1 million in 2006 to 10.4 million in 2050, and its share of the elderly population will grow from its current 8.3% to 12%. Those age 85 and older – of which 62.4% had a least one limitation according to this analysis – is expected to triple in the next 40 years (Administration on Aging, 2008). Despite rising obesity rates (Wright, Riggs, Lisse & Chen, 2008), the life

expectancy of Black women continues to rise because of improvements in heart-disease outcomes (Harper, Lynch, Burris & Smith, 2007). Such developments are likely to lead to added years of disability for Black women. The Black high school graduation rate was 65% in 2002, down from more than 70% a decade earlier, and is well below the 81% White graduate rate (Heckman & Lafontaine, 2007).

Policy makers and public-health officials should be preparing for the inevitable demographic surge in older Americans. The clear association of age and disability dictates a sense of urgency in a number of health-care sectors: the training of an increased supply primary care and gerontology practitioners; more nursing home and assisted living facilities and staffing; medical equipment and technology, and greater support for family caregivers.

This research also alerts policy makers to the special needs of Black women. As an increasing number become elderly, more intensive guidance on healthy diet and exercise could help combat the cohort's greater propensity toward disability. And because elderly Black women are more likely to be living alone, they are more likely to need public-sector assistance.

The virtue of education has been a consistent public-service message. But scant attention has been paid to the well-established, evidence-based link between health and education. The direct effect of higher levels of education – and its connection to health and wealth – is a compelling argument that younger people need to hear.

This study would have been strengthened by an adequate response of household income data. Such data would address more directly the association between income and

disability. The cumulative disadvantage of a lifetime of low income clearly sets the stage for limitations in the elderly, and minimizes the likelihood of having the financial resources to combat what are often multiple chronic conditions. Increasing inequality of income will perpetuate racial disparities in disability.

Limitations

There were several limitations to this study. The NHIS survey questions did not specifically address ADLs and IADLs, failing to address physical activity limitations separately for independent activities elderly Americans may need to perform. But activities referred to as activities of personal and routine care were generally considered ADL and IADL disabilities, respectively.

Because the survey questions focused on the self-reporting of level of dependence rather than the causes, no distinctions were made regarding physical and cognitive disability. The survey's health measures were not clinically confirmed.

Confidentiality is an additional concern because respondents may be uncomfortable in relaying personal information. Because the data were based on self-report, prevalence may be underreported or overreported (Ettinger et al., 1994), leading to a potential bias in the differences in disability and functional limitation. However, there was no reason for assuming more over- or under-reporting so the results may not be biased. The data were cross-sectional, meaning there was no measurement of the incidence of functional limitations or disability. An additional limitation in this regard was that the data could not test longitudinal causal pathways in the disablement process.

This analysis was limited to community residents. The limitations of those residing in institutions could be driven by other factors.

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