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THE ROLE OF CHRONIC ILLNESS, PERCEIVED CONTROL,
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IN MENTAL WELLBEING AND ALTERNATIVE
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THE ROLE OF CHRONIC ILLNESS, PERCEIVED CONTROL, SOCIAL SUPPORT,
AND HEALTHCARE DISCRIMINATION IN
MENTAL WELLBEING AND ALTERNATIVE HEALTHCARE

By

Kimberly Renee Barber

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ABSTRACT

THE ROLE OF CHRONIC ILLNESS, PERCEIVED CONTROL, SOCIAL SUPPORT, AND HEALTHCARE DISCRIMINATION IN MENTAL WELLBEING AND ALTERNATIVE HEALTHCARE

By

Kimberly Renee Barber

Background: Because it is a chronic process that includes the proliferation of multiple stressors, a chronic illness can lead to significant psychological distress. Within the framework of the stress proliferation model, a chronic illness is a significant predictor of such distress. Coping with the distress through greater personal agency and utilization of alternative therapies is proposed to mediate the effect on distress. Discrimination in seeking healthcare, as a moderating factor, was hypothesized to add significantly to the prediction of the distress.

Methodology: The 1996 National Survey of Midlife Development in the United States (MIDUS) was utilized for this secondary analysis. There were 4242 respondents, aged 25 – 74 years, surveyed by phone on physical health, midlife development, and social responsibility. Of these, 3680 responded to a mail survey on aspects of health lifestyles and psychological health. The 728 on current treatment for depression were excluded leaving 2934 respondents for the current analysis. Abbreviated versions of a depression, anxiety, and perceived control scales were applied. Chronic illness and alternative therapy use were measured by index lists. Discrimination was measured by health seeking events per lifetime. Multiple regression analysis was conducted on models for each dependent variable. Family status, social support, personal agency, and

socioeconomic status were controlled in the analysis. The final linear regression model constructed estimated the significant contribution of each independent variable to illness status in predicting stress and psychological distress.

Results: Chronic illness was reported by 2095 (71%) respondents. Chronic illness was a significant predictor of depression ($p < .05$). The effect was mediated by perceived control ($p < .01$). Discrimination measured by perceived interference in life was significant ($p < .05$). Chronic illness was a significant predictor of alternative therapy use ($p < .01$). Female gender and high educational attainment were significant independent predictors of use ($p < .05$ & $p < .01$).

Conclusions: The current analysis supports the premise that chronic illness is a stressor that is associated with the emergence of other stressors, such as distress from discrimination. Chronic illness is also a strong predictor of health seeking behavior and may reflect greater unmet healthcare need among those experiencing ongoing, long-term stresses.

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INTRODUCTION

This proposal examined contemporary issues in social-psychological distress related to chronic illness. Chronic illness (both disease and disability) is prevalent in American families today with incidence rates continuing to rise for many conditions. Some chronic illnesses (e.g., diabetes and asthma) have become significant public health concerns (Mannino et al 2002; Eisenmann 2003; Mascie-Taylor and Karim 2003). Such ongoing, long term conditions must be managed within the context of social status while negotiating a healthcare system that is geared toward acute illness and accidents. Those with chronic illness must not only cope with this larger context but also must cope with both their role in society (i.e., spouse, parent, employee) and that of long term patient. The latter role may emerge unexpectedly or gradually but none-the-less become a new long-term commitment, and thus deserves the label of what Leonard Pearlin refers to as an 'unexpected career' (1994). Various types of role-related strains emerge for a person when managing a chronic illness that can be conceptualized as chronic stressors. Furthermore, the relationship of these multiple stressors fit within the framework of the stress proliferation model as demonstrated from multiple secondary stressors initiated by the primary stressor of a chronic illness.

This analysis sought to show that chronic illness contributes a unique strain to persons within the context of other psychosocial factors as conceptualized by the model of the Stress Proliferation Process. The key dependent variables for this analysis were depression, anxiety and utilization of alternative therapies. The main independent variables included the presence of a chronic illness, discrimination in seeking medical

care, and perceived control. Key variables to be controlled in the analysis were socioeconomic status, marital status, quality of spousal support, and prior use of health care services.

Distress, as measured by depression and anxiety indexes, is the major dependent variable for this analysis. Chronic stressors have the power to disrupt activities, relationships, and life and once established may have an adverse impact on mental health and well-being (Pearlin, et al. 1990). Long-term illness presents a person with role strains, relationship conflicts, and violations of normative life-course expectations as they deal with each serious exacerbation of symptoms and/or the long-term morbidity of the condition. The persistent nature of these chronic stressors places the ill person at considerable risk of such negative mental health outcomes as increased distress, anxiety, and depression.

The main independent variable for this analysis was the presence of a chronic illness. Unlike urgent accidents and acute illnesses, a chronic illness is ongoing and long term, often emerging insidiously and persisting through growth phases. The expansion of emerging, persistent stressors over time has the potential to give rise to an accumulation of stressors and thus a proliferation of stress. Chronically ill persons can find themselves directing more and more of their energies toward illness-oriented needs rather than health maintenance. Illness demands are added followed by additional concerns, worries, and feelings of guilt.

A second key independent variable in this analysis was that of discrimination—both the experience of discrimination in general and in seeking medical care specifically. The experience of discrimination is directly related to poor mental health outcomes

because of the stressful environment that is created (Harrell 2000; King 1996). In regards to the chronically ill person, the experience of discrimination may be a mediating factor which increases the likelihood of chronic illness or of severe disease from environmental hazards and barriers to quality medical care (Weinick et al 2000). However, for persons seeking medical care for a chronic illness, the barriers presented by discrimination during the illness trajectory create additional strains and frustrations that may significantly multiply the impact on mental strain. The effect of discrimination when seeking medical care was expected to moderate the association between managing a chronic illness and distress. For some acute illnesses, the inability to obtain desired care can be ignored when faced with barriers due to discrimination, although it remains a stressful experience. Yet for chronically ill persons, the inability to achieve desired health outcomes may be ongoing as well, as encounters with the healthcare system multiply.

Perceived control (i.e., having personal resources such as high self esteem and a sense of control in life) was a key independent variable that may mediate the effect of chronic illness on distress. Ill persons with the personal resources to overcome barriers in access to care, to persist in challenging difficulties presented by others, and to seek out and utilize alternatives in order to manage their illness over time are likely to experience less distress than those without such personal resources. Perceived control was expected to mediate the effect of chronic illness on distress. Persons with high perceived control were expected to experience less daily stress and to utilize more alternative methods in managing their illness and therefore be at lower risk of mental distress and/or depression.

Because socioeconomic status (SES) is associated with all three independent variables and with the dependent variable, it was controlled for in the statistical analysis.

For the same reasons, marital status, the quality of support, presence of children, and prior use of health care services was analytically controlled.

We proposed that the presence of chronic illness is a significant predictor of social-psychological distress, discrimination significantly increases the effect, and that personal agency mediates the effect beyond that of socio-economic status and demographic characteristic factors. The tendency within the initial domain of chronic illness for new stressors, such as discrimination when seeking care, to present themselves and for preexisting stressors to be exacerbated by barriers to care, demonstrates the Stress Proliferation concept. This concept was tested to show whether a chronic illness is indeed a significant predictor of distress and if discrimination increases the effect significantly, and whether personal agency tempers the effect by decreasing the risk.

CHAPTER ONE

BACKGROUND

The Stress Process Theory

Early stress models quantified stressors as significant life experiences that are relatively time-limited and occur as events across various domains of life experience (Holmes and Rahe 1967). The occurrence of a major event (such as the death of a spouse) or of multiple events (such as divorce and being fired from a job) signaled an increased risk of stress-related illness. The development of the Holmes-Rahe Social Readjustment Scale meant that such risks could be quantified according to critical values that signify varying levels of risk (Holmes and Rahe 1967). Established definitions of stress as a process emphasize the importance of viewing stress as a dynamic process rather than a single, acute event (Pearlin 1989; Lester et al., 1994; Wheaton 1996). Stress may originate from multiple, ongoing sources that are not as immediately recognizable as an acute, life event yet nonetheless can have a profound negative effect on health. These chronic, more continuous sources of stress (called stressors) are more inherently insidious in onset and ongoing than discrete life events, but may result in high levels of stress or lead to maladaptive behaviors (Wheaton 1994). Blair Wheaton has extended the traditional stress model to more fully represent the concept of the stress process as a continuum. He contends that stress can result as much from too little change as from too much sudden change, as when an individual is exposed to continuously difficult or demanding environments that do not change. Wheaton conceptualizes these stressors as 1) developing as continuing problematic conditions in our social environment and roles, and

2) typically having a longer time course than life events from onset to resolution. Chronic stressors are either defined by the nature of daily role enactments or are so regular in the enactment of daily roles that they behave as if they are continuous for the individual.

Brown and Harris (1978) refer to chronic stressors as life difficulties. They distinguish chronic stressors as difficulties in ongoing adversities that people face. They provide such examples as a spouse's drinking problem or a partner's chronic health problem. Brown and Harris contend that such ongoing difficulties have importance independent of life events in predicting negative health outcomes such as depression.

In reflecting on stress process concepts, Leonard Pearlin (1999) notes that the stress process occurs within a broader social context. A key assumption of the model is that diverse factors that are interrelated converge on people's well-being. Among these converging factors are the social statuses of individuals, the contexts that envelope their daily lives, their exposure to stressors, the resources upon which they are able to call upon, and the stress manifested in their psychological and physical functioning. A second assumption of the stress process perspective is that people engaged in the ordinary pursuits of life can be exposed to multiple and highly complex stressors depending upon the context within which they live. A person's standing in the social order, economic class, gender, race, and ethnicity have the potential to pervade the structure of their daily lives and the experiences that flow from it. Thus, status placement of people can create a universe of stressors that set the stage for life difficulties, strains, and chronic stressors (Figure 1).

An implication of this "web of interconnections" among multiple factors is that a change in one can effect changes in the others and set in motion chains of effect (Pearlin

LI 1999). Stressful events, whether life events or chronic stressors, rarely occur in isolation – rather events may initiate, precipitate and then influence each other in a process that unfolds, accumulates, and feeds back on previous stressors (as seen in Figure 1).

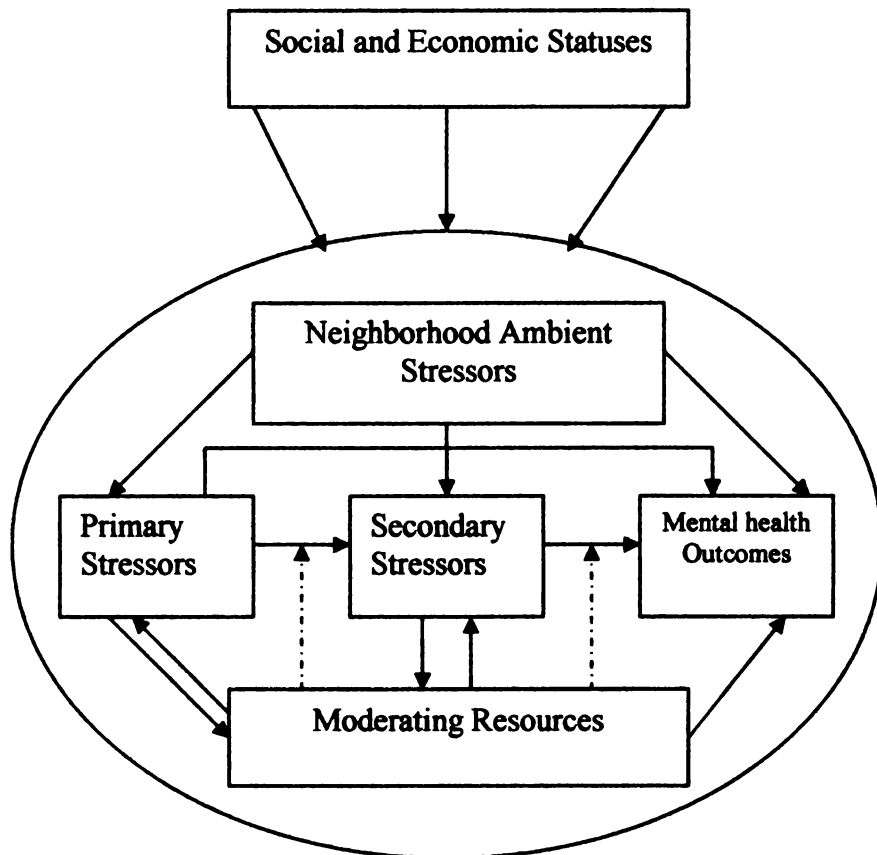


FIGURE 1: The Stress Process Model (Pearlin, LI 1999).

That the structure of an experience in one setting (i.e., social isolation or social aspiration disconnect) can structure action in another setting (i.e., suicide or anomie) has been noted empirically throughout history (Thomas, WI 1928, Durkheim E 1951, Merton, RK 1968, Mechanic 1978, Pearlin LI 1989). Durkheim (1951) showed suicide not as a rash act of deviant behavior but as a consequence of people's attachments to others. Thus, the values attached to social status and the conditions surrounding them

contribute directly to well-being and stressful outcomes (Pearlin, LI 1999). For example, not only does divorce have implications for an individual's role as spouse, but it also has social implications through means of guilt, shame, and status decline.

Within this web of interconnectedness various types of role strains emerge as chronic stressors (Pearlin, 1983). They include being in a role whose demands exceed capacities, being a captive of the role, being in conflict with others in the role set and trying to reconcile the simultaneous demands of dual roles. The issue of role strain from an unexpected or emergent role is specifically pertinent to the topic of chronic illness. Pearlin refers to these as care-giving roles that become long-term commitments and thus deserving of the label of "unexpected careers" (Pearlin and Aneshensel, 1994). Emergent illness roles surface within a context of pre-existing multiple roles and the accommodation of the new role demands restructuring of existing roles. Such restructuring may bring, depending on available resources, restriction of activities, conflicts with others, and irreconcilable strains from competing demands (Pearlin 1999; Pearlin, et al. 1990). Activities directly associated with long-term care giving can also become chronic stressors and can themselves lead to stressors in other domains of life. This multiple loading of stress is referred to as stress proliferation (Pearlin, et al. 1997).

The Stress Proliferation Model

The Stress Process model provides a conceptual framework that accounts for multiple, ongoing sources of chronic stress. However, sources of stress are not always independent. Not only do stressors occur within a complex process, but any particular stressor within the web can lead sequentially to other stressors (as is demonstrated in the mid section of the model in Figure 1). Pearlin (1989) developed a conceptual framework

referred to as the stress proliferation model. Stress proliferation occurs when an initial primary event causes stress that leads to the emergence of other secondary stressors. Stress proliferation is critically important to the stress process model due to the creation of secondary stressors. Rarely are people exposed to only one severe stressor (see Figure 2).

PRIMARY STRESSORS

SECONDARY STRESSORS

OUTCOMES

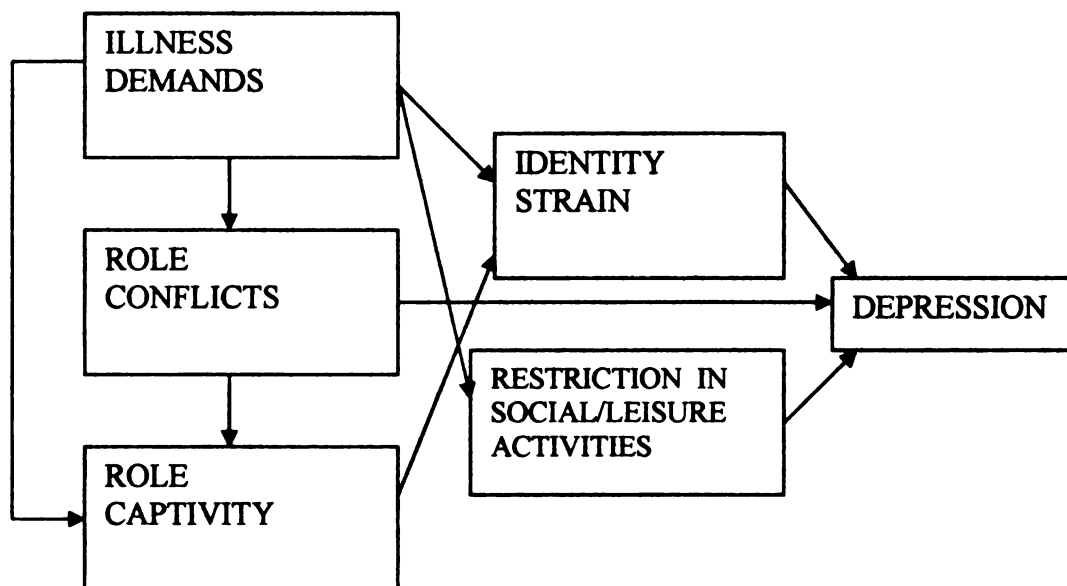


FIGURE 2: Primary and Secondary Stressors: Pathways to Depression (Pearlin et al. 1997).

An initial stressful event, such as divorce, often leads to additional event-related stressors, such as financial losses and single parenting (Pearlin, 1999). The initial stressor is referred to as primary and those that follow as secondary (Pearlin, 1989). The terms do not imply importance, but are intended to distinguish stressors according to the temporal order in which they can be observed. Underlying the conceptual model is the presumption

that stressors appear sequentially, rather than simultaneously, as the stress process unfolds (Pearlin 1999)

The dynamic aspect of the stress proliferation process underscores the multiple number and types of stressors to which people can be exposed. The process is described by Pearlin as a changing configuration of stressors in which people become enmeshed (Pearlin, et al., 1981). The various stressors surface and recede, as well as combining with each other over time. For example, a person may experience stress from a spouse's illness as an initial acute and major event which leads to other ongoing stressors that can precipitate additional acute and major events, particularly when the illness is severe. The stress proliferation model is suggested to explain some of the differences among individuals in outcomes when they experience similar stressors. Beyond the effect of resources to moderate negative outcomes in mental health, differences in outcomes among those exposed to similar stressors remain (Pearlin, 1999). Secondary stressors then help to explain the differences in this relationship. Individuals in similar circumstances may be very different in the presence and effect of secondary stressors.

According to Pearlin (1999), the major mechanism giving rise to stress proliferation in the form of secondary stressors resides in the basic feature of social and economic life. Specifically, he points out that people are the incumbents of multiple roles located both within formal institutions, such as the family, and informal domains, such as friendships. There exists a structural separation in people's multiple roles which helps them shift ground as they move between their roles and interact with others in the role set. However, the structure of the experience in one setting comes to structure action in another setting. Secondary stressors then arise from the consequent setting where the

obligations of one role make the enactment of another role difficult. A pertinent example in the literature is observed among women in the workplace who find it difficult to satisfy the requirements of their jobs and the demands associated with the care of young children (Lennon and Rosenfield, 1992; Menaghan, 1991). In this case, secondary stressors surface when the obligations of the parental role make the obligations of the occupational role difficult to meet. It holds true even more so when the illness role is added to the parental/worker role. The “priority claims of one role, then, can render the enactment of another role problematic” (Pearlin, 1999).

However, as Aneshensel cautions, the appearance and intensity of secondary stressors may also be influenced by one’s standing in systems of inequality (1999). Thus, the conditions contributing to the creation or exacerbation of a primary stressor (low SES, minority status, or comorbidity) may also contribute to the emergence and intensity of secondary stressors (i.e., severity of illness).

Chronic Illness

The conceptual framework developed by Pearlin (1989) referred to as stress proliferation was employed here to explain the effect of chronic illness and its impact on mental health. The model is particularly pertinent because of the ongoing, chronic, and cumulative effect that long-term illness can have on the psychological well-being of a person. Stress proliferation occurs when an initial primary event, a diagnosis of a chronic illness for example, causes stress that leads to the emergence of other secondary stressors, such as role strain. The illness does not occur in isolation, it initiates and then influences other events and stressors and, along with the social environment, conditions action that is taken.

The effect of an ongoing illness on mental health can be considered a type of chronic stressor. The illness role can itself cause strain on the individual's psychological health. Various types of role strains emerge that have been identified by Pearlin (1983) as chronic stressors. They include being in a role whose demands exceed personal capacities, being a captive to an illness role, roles conflicting with other schedules, and trying to reconcile the simultaneous demands of the dual roles of such as maintaining the roles of spouse, employee, and health advocate.

The issue of an unexpected or emergent role is specifically pertinent to the topic of chronic illness. Illnesses are rarely known in advance and therefore by definition not planned for. Even for conditions that have a gradual onset, few people are prepared for the changes, the demands, and the novel responsibilities that are created by the illness. Various degrees of restructuring, depending on available resources, are necessary to accommodate an illness that is ongoing. Ill persons become restricted in their usual activities. Conflicts with other activities occur as when schedules need to accommodate emergent and urgent medical visits. Competing demands strain mental resources as when work obligations and personal duties collide. Unlike acute illness in which demands, conflicts, and restrictions have a finite time frame, chronic illness can be endless and therefore stretch the capacity of parents to cope without negative psychological outcomes.

For these reasons and more, the presence of a chronic illness involves multiple stressors that unfold from the initial diagnosis (primary stressor) to illness management and coping (successive and secondary stressors). Renegotiating multiple roles (e.g., as parent, spouse, and/or employee), is the major mechanism through which secondary

stressors emerge from the primary stressor. For example, a person who works fulltime and deals with an ongoing illness must reschedule time off work to accommodate the multiple medical visits or must cope with the mental strain of missing work to do so.

In addition, the social status of an ill person influences the likelihood of presence of the primary stressor (e.g., developing severe disease) and the consequent secondary stressors (problems obtaining care to manage the disease). Other roles such as lone parenting is associated, through lower socioeconomic status, with greater severity of illness and is associated with a lack of resources to manage the illness, as well as, to manage the distress (Benzeval 1998, Montgomery, et al 1996). Once established, these consequent problems become added independent, albeit related, cumulative stressors in the life of the person with a chronic illness.

The stress proliferation model illustrates how chronic stressors can be additive in their effect on mental health outcomes. However, some stressors in the chronic stress process can modify the effect by exacerbating an existing problem with the appearance of a stressful exposure that modifies the impact of life stresses on psychological adjustment. Discrimination, through unfair treatment and feelings of exclusion, can condition the exposure, experience, and/or response of chronic stress for a particular group and thereby place them at greater risk of poor mental health outcomes.

Discrimination

A recent comprehensive literature review of representative findings on racial and ethnic disparities in medical diagnosis and treatment describes the current state of health status among minorities in historical terms and highlights the ethical implications of disparities in health (Geiger 2003). Geiger points out that at no time in the history of the

United States has the health status of minority populations equaled, or even approximated, that of white Americans (2001). Although the health of all Americans has improved dramatically in the last several decades, excess morbidity and decreased life expectancy for minorities has stubbornly persisted. Most recently, a significant disparity in life expectancy at birth has been shown among black American populations even for a chronic disease with inherently low rates of mortality (Barber and Johnson 2004). Geiger emphasizes this persistence of inequality in his review by illustrating the findings of Williams and Rucker (2000) that in 1995, the overall African-American mortality rate was 60 percent higher than that of whites – “precisely what it had been in 1950”.

Research continues to show poorer outcomes for racial minorities compared to non minorities across various diseases including coronary artery disease (Hemingway et al., 2001), diabetes (Rucker-Whitaker et al., 2003; McBean et al., 2003), hypertension (Jackson et al., 1996), cancer (Elston-Lafata et al., 2001; Dominitz et al., 2002; McMahon et al., 1999), asthma (Bosco, Gerstman, and Tomita 1993), and mental distress (Pak et al., 1991) and depression (Comas-Diaz and Greene 1994). The disparity has been observed in both adult and pediatric populations. In the case of asthma, a study of black and white Medicaid insured children in Detroit found that black children were much more likely than white children to receive inadequate therapy (i.e., obsolete medications that do not follow current guidelines) and were less likely to receive steroids or adrenergic inhalers (Bosco, Gerstman, and Tomita 1993; Joseph et al., 1998), despite higher rates of health care visits and higher rates of hospitalization.

Emperical studies have variously attributed racial disparities in health to such causes as socioeconomic status, environmental hazards, inferior housing, poor nutrition,

lifestyle and behavioral choices, and cultural beliefs. However, even when these factors are held constant disparities in health persist. Two other explanations have come to the forefront of health disparity research, healthcare access and discrimination as an independent effect.

Lack of minority access to health care has been shown to occur through multiple mechanisms from residential segregation and geographic restrictions on quality healthcare to rationing of medical services through the availability of comprehensive health insurance (Blendon et al., 1989; Weinick, Zuvekas, and Cohen, 2000). Current research has shown that racial minorities receive different treatments than non minorities for similar conditions, such as heart disease, even after controlling for access or barriers to care related to insurance, socioeconomic status, location, and regular physician utilization (Conrad et al., 2003; Suresh et al., 2002). The existence of such a situation can itself be considered a form of discrimination. Thus, racial or ethnic discrimination may be an important contributor to health disparities, not merely through the historic and persistent disadvantages it creates for minorities in the social structure but also specifically through individual and institutional level health provider bias (Geiger 2003). Geiger (2003) emphasizes that , whatever the causes, the experience of minorities within the health care system differs from that of comparable whites across a broad range of disease categories. The problem of racial and ethnic disparities in diagnosis and treatment particularly, had become up until most recently, an important subset of the issue of achieving equity in health status (Department of Health and Human Services, 2000).

Large-scale studies have examined racial differences in the adequacy, intensity and quality of diagnostic and therapeutic procedures. One of the largest reviewed more

than 1.7 million hospital discharge charts to examine use of procedures in 77 disease categories among more than 500 acute care hospitals (Harris, Andrews, and Elixhauser 1997). Black Americans were significantly less likely than whites to receive therapeutic interventions for half of the 77 disease categories even after controlling for patient age, severity of disease, health insurance coverage, and hospital type. A study comparing experiences of Hispanic with non-Hispanic patients in California, Florida, and New York found that Hispanics were less likely to undergo major surgical procedures in 38 percent of 63 disease categories (Andrews and Elixhauser 2000). Similar disparities have been observed in more common and simple procedures such as laboratory testing and drug therapies. Ayanian et al., (1999) examined in-hospital patients with congestive heart failure and pneumonia. After adjustment for socioeconomic status, health coverage, and type of hospital, black Medicare patients were significantly less likely than whites to receive adequate laboratory and diagnostic tests and/or drugs such as diuretics and antibiotics.

General and orthopedic studies present similar findings consistent with the disparities in diagnosis and therapy. Blacks hospitalized in Maryland had lower rates of surgeries and the incidence among blacks was particularly low for more elective surgeries (Gittelsohn, Halpern, and Sanchez 1991). Even more disconcerting is that the findings of a large retrospective cohort study of amputation and leg-sparing surgery for peripheral vascular disease among Medicare beneficiaries. This study comparing African Americans with white Americans with and without diabetes, found that African Americans were significantly less likely to receive lower-extremity arterial revascularization (Guadagnoli et al., 1995). African Americans are 32 percent less likely than whites to receive

laparoscopic surgery (Arozullah et al., 1999), to receive total hip replacement (Wilson, May, and Kelly 1994) or total knee replacement (Baron et al., 1996). Even in intensive care units (ICU) where critical care is provided round the clock, disparities exist between racial and ethnic patient populations. In a national sample of ICUs in the United States, African American patients received significantly less monitoring, fewer tests, and less life-support treatments than whites in the first 24 hours, even after adjusting for age, type and severity of disease, and hospital characteristics (Williams et al., 1995).

Findings that likely reflect inadequate primary and preventive care was highlighted by a study in which African American Medicare beneficiaries were more likely to undergo bilateral orchiectomy for prostate cancer (late stage surgical intervention) and more likely to undergo lower limb amputation (late stage surgery) (Gornick, Eggers, and Reilly 1996). Using claims data for Medicare beneficiaries in 10 states and the District of Columbia, a subset was studied that matched beneficiaries on the basis of zipcode to neutralize the effects of black-white differences in provider access and regional practice patterns. Despite adequate health coverage, black patients' utilization was substantially weighted toward lower-cost procedures (Lee et al., 1997). The authors concluded that providers appeared to be giving "less intensive care to otherwise similar black Medicare beneficiaries".

That these disparities can in many cases be explained by discrimination and bias in diagnosis and treatment, and that such differences do contribute to the excess burdens of morbidity, disability, impaired quality of life, and premature mortality may be an indication of problems of race and ethnicity discrimination in the larger society (Geiger 2001). The role of individual or institutional bias in creating racial and ethnic disparities

in care is difficult to quantify empirically. However, influences on decision making by clinicians has been identified since 1957 (Geiger, HJ). Recent studies have linked provider perceptions at every medical level, from medical student to physician resident to experience practitioner, to decisions as varied as judgments of patients' quality of life (Rathore et al., 2000), physician-patient communication (Waitzkin 1985; Cooper-Patrick et al., 1999), and the management of pain (Weisse et al., 2001). Geiger points out that neither the health care system as a whole nor individual providers are fully insulated from attitudes toward race, ethnicity, and social class that are prevalent in the larger society (2001).

Racial stereotyping has been shown to contribute to health and wellbeing disparities. African Americans are more likely than whites to be diagnosed as psychotic but less likely to receive antipsychotic medications (Abreu 1999). They are more likely to be hospitalized involuntarily, to be regarded as potentially violent, and to be placed in restraints in both the inpatient and the outpatient settings (Benson 1983; Rosenfield 1984; Sleath, Svarstad, and Roter 1998; Kales et al., 2000; DelBellow et al., 2001). Furthermore, provider and institutional bias have been shown to be significant contributors of disparities in health care. A number of empirical studies have supported this conclusion in which provider views are assessed or decision-making of physicians are blinded to patient race and ethnicity. Professional responses to white and non-white patient subjects enrolled in experimental, controlled studies have been found to differ significantly in diagnosis, prognosis and therapeutic recommendations (Geiger 2003).

Unequal treatment as a result of racial/ethnicity or gender stereotyping, racial bias, or discrimination has been repeatedly demonstrated in empirical research. Despite

the capacity of medicine to diagnose, treat and cure disease, minorities have not benefited fully or equitably from advances in medical science. A chronic lack of benefit due to discrimination can itself be a source of stress. The lesser likelihood of receiving medication for pain (Todd, Samaroo, and Hoffman 1993) or of receiving adequate analgesic for cancer treatment (Cleeland et al., 1997) in situations that normally require pain amelioration adds to the burden of stress from the disease itself. A greater incidence of failed patient-provider communication and lesser satisfaction with care received reported by minorities suggests greater stress in relation to the disparate care than for their white counterparts. Discrimination in the pursuit and acquisition of health and medical care has been conceptualized as one of several types of racism-related stresses (Harrell, S.P. 2000). Harrell (2000) puts forth at least six types of stressors related to racism of which daily hassles (racism microstressors) and chronic strain (chronic-contextual) are two types that are illustrative of unfair treatment related to health care access.

Unfair treatment stemming from discrimination thus is an important class of chronic stressors (Kessler, Mickelson, & Williams 1999). It has long been established that exposure to discriminatory behavior is an important feature of life for socially disadvantaged groups, including racial minorities (Essed, 1991; Thompson, 1996), women (Gardner, 1995 ; Krieger, 1990), and the poor (Turner & Lloyd, 1995). Empirical research has been less consistent in showing that differential exposure is a cause of mental distress, in part due to confusions in measurement with differential vulnerability (Kessler et al., 1999). It has previously been suggested that differential exposure to stress plays an important role in explaining the higher prevalence of psychological distress

among lower status persons (Thoits, 1983). Yet, research has been slow to incorporate measures of discrimination along with major life events which has led to incorrect conclusions that minorities, women, and others exposed to high levels of discrimination are failing to cope when in reality they are being exposed to more secondary stresses (Kessler, Mickelson, and Williams 1999).

Perceived discrimination is one of the most important secondary stressors associated with major stressor events (Williams, et al. 1997). It has been significantly associated with job loss and exposure to violence (Thompson, 1996). A positive association has been observed in an analysis evaluating the effects of discrimination, utilizing a unique inventory measure of perceived discrimination, on psychological outcomes (Kessler, Mickelson, and Williams 1999). Investigators utilized the MIDUS national survey (Brim et al., 1996) which assessed perceived discrimination of any type rather than only on the basis of gender, race, or social class. Perceived discrimination and lifetime exposure to discrimination were measured, as well as chronic daily discrimination. Authors constructed a continuous scale of frequency of perceived daily discrimination. Lifetime perceived discrimination significantly predicted nonspecific distress ($p < .001$) and major depression ($p < .001$). Frequency of daily discrimination was found to be statistically significant in predicting major depression and generalized anxiety disorder ($p < .05$). No evidence was found of a cumulative effect in predicting outcomes. In other words, the presence of any perceived discrimination was just as significant of a stressor in predicting depression or anxiety as was the report of multiple types of perceived discrimination.

Discrimination then, the experience of and perceived, may be one form of stress proliferation whereby the expansion of a primary stressor, such as illness, is reflected in

the addition of secondary stressors such as discrimination in receipt of medical services. Discrimination proliferates and compounds the experience of stress directly through unfair treatment and indirectly through the failure to receive a needed or wanted treatment. In both, discrimination fits the chronic stressor defined by Brown and Harris (Brown & Harris, 1978) and conceptualized by Wheaton (1999) as life difficulties that develop as continuing problematic conditions in our social environment and roles with a longer time course than that for life events.

From this framework of differential exposure, discrimination may modify the effect of a primary stressor through increased exposure to secondary stressors and/or the proliferation of increased severity of the stressor compared to those who are not discriminated against. Within the stress process concept, discrimination adds to the stress continuum by accounting for additional, multiple, and ongoing sources of chronic stress.

Alternative Medicine

Complimentary and alternative medicine (CAM) has become increasingly common in the United States. It encompasses a wide range of treatment options including herbal supplements and vitamins, acupressure and acupuncture, meditation, and prayer. Up to one-third of the American adult population reported in 1993 use of CAM to treat a problem in the previous year (Eisenberg et al. 1993). The number of visits to CAM providers in 1998, an estimated 425 million, has surpassed the number of visits made to primary care physicians (Wagner et al. 1999). The core values of CAM (e.g., individualism, personal responsibility) offer a response to the growing complaints of conventional medicine, with its lack of emphasis on the individual, on prevention, and on caring (Goldstein 2000). The increasing popularity of CAM in recent years has further

increased the options to patients regarding health care interventions (Pachter et al. 1998). A major incentive reported by users of CAM is the ease of access to the alternative medicines (Wagner et al. 1999). Furthermore, individuals with unmet healthcare needs are significantly more likely to use CAM (Sturm and Sherbourne 2001).

Alternative medicine is now a common option for many sectors of society including the elderly (Smola et al. 2001), children (Pachter et al. 1998), minorities and non minorities (Chen MS 1999; Mackenzie et al 2003; Pachter et al. 1998). Among rural residents in Illinois, nearly two thirds of 176 respondents reported use of CAM (Herron and Glasser 2003). CAM has also become a common treatment for a multitude of conditions from the common cold (Pachter et al. 1998) to diabetes (Egede et al. 2002) and disability (Ong et al. 2002). Independent predictors of CAM include chronic pain (Haetzman et al 2003), disability (Ong et al. 2002), diabetes (Egede et al. 2002), older age , higher educational attainment (Cherniack et al. 2001; Mackenzie et al. 2003) and female gender (Cherniack et al. 2001; Mackenzie et al. 2003). Among a population of elderly primary care patients (Cherniack et al. 2001) and among Taiwanese hospitalized patients (Yang et al 2002) use of CAM was not correlated with income, race, or self-perceived health. However, among respondents under 65 years of age, having a chronic medical condition significantly increased the likelihood of concurrent use of care (Muhajarine et al. 2000). Men, those reporting high levels of distress, and those for whom spiritual values were important were also more likely to use CAM as an adjunct to conventional medicine.

The relationship between the use of CAM to the presence of chronic illness is expected to be increased significantly by perceived control. Perceived control (i.e., self

esteem) is positively associated with behaviors that protect health (Lefcourt and Davidson-Katz 1991). Empirical evidence shows that individuals with greater perceived control behave more adaptively when faced with health concerns are more likely to engage in preventive health behaviors, and to seek appropriate medical care (Lefcourt and Davidson-Katz 1991). They are more likely to consider alternatives in the face of barriers, to take action, and to choose adaptive strategies for dealing with stressors (Cohen and Edwards 1989). Therefore, persons with high perceived control are more likely to take an active role in their own healing and when encountering barriers to care are more likely to seek out alternatives in order to gain the care they need (Goldstein 2000).

Dissertation Intent

The aim of this examination was to present survey data on the national prevalence of chronic illness, the prevalence of discrimination related to seeking medical care, and their relationship to the mental health and behavioral outcomes of depression and utilization of alternative healthcare.

Primary Hypotheses:

Chronic illness significantly increases the risk of mental distress/depression and also significantly increases the likelihood of reported use of alternative healthcare.

Secondary Hypotheses:

1) The relationship between chronic illness and depression is modified by the experience of discrimination in general and by the experience of discrimination in seeking medical care specifically. Those with chronic illness who report discrimination

will have increased risk of depression compared with those who experienced no discrimination.

- 2) The relationship of chronic illness and depression is mediated by perceived control. Those with chronic illness with high perceived control will have decreased risk of depression.
- 3) The relationship between chronic illness and alternative care utilization is modified by discrimination. Those chronically ill who report discrimination will have an increased likelihood of alternative care compared with the non-discriminated.
- 4) The relationship between chronic illness and alternative care utilization will be mediated by perceived control. Those with higher perceived control will report greater alternative care use even among those with chronic illness.

The design of this empirical examination is a quasi-experimental case comparison study in which cases are survey respondents with a chronic disease and are compared to respondents who do not have a chronic disease. The analysis attempted to provide empirical support that the presence of chronic illness is a unique source of stress and that differential exposure to discrimination in general and in medical care services specifically accounts for a greater magnitude of mental strain for those reporting the discrimination. Specifically, it is hypothesized that persons with a chronic illness will report more experiences of 1) daily stress, 2) chronic stress, and 3) depression, and will be more likely to turn to alternative treatments in their attempt to cope with the ongoing struggle of dealing with a chronic illness. Furthermore, the additional burden of experiencing discrimination when seeking medical care for their illness may place ill persons at greater risk of mental distress than their non-ill counterparts.

Daily stress, as measured by the report of daily coping demands was compared between households reporting the presence of a chronic illness and those reporting no chronic illness. Chronic stress, as measured by the report of life's demands, sadness, worry, anxiety and depression was compared between the case and comparison groups. Alternative therapies, as measured by reported use of herbal supplements, mega vitamins, and other alternative care was compared between the case and comparison groups.

The primary hypothesis was that distress (depression and anxiety indexes) will be significantly greater among those with illness than among those without an illness beyond that which is attributed to socioeconomic status, educational attainment, or race. Furthermore, those experiencing discrimination, and specifically those experiencing discrimination in seeking medical care, will have significantly more mental distress than those who do not experience discrimination. We believed the addition of discrimination as a modifying factor in the relationship between the presence of a chronic illness and mental distress would increase the association significantly. Finally, among chronically ill persons, those reporting experiences with discrimination would be significantly more likely to report alternative therapy use than those not experiencing discrimination.

The proposed hypothesis was tested by secondary analysis utilizing a population-based national survey conducted in 1996. Subjects for the current analysis were classified from the original dataset of over 4000 respondents according to family status and the presence of a chronic illness. Index measures were constructed from survey scales and validated with reliability and correlation testing. The dependent variables (daily stress and depression/anxiety) were hypothesized to predict the presence of a chronic illness compared to those not chronically ill. Coping, by means of higher

perceived control and greater alternative therapy use, was hypothesized to mediate the effect between illness stressors and depression/anxiety helping to diminish the effect but not abolish it altogether. Discrimination was examined for its moderating effect on the chronic illness and the depression/anxiety relationship. The experience of discrimination was expected to increase the effect on depression and anxiety. However, its effect was hypothesized to be larger for those with a chronic illness than those without such an illness.

CHAPTER TWO

METHODOLOGY

Dataset Description

The National Survey of Midlife Development in the United States (MIDUS) was a collaborative, interdisciplinary investigation of patterns, predictors, and consequences of midlife development in the areas of physical health, psychological well-being, and social responsibility. Respondents were drawn from a nationally representative random-digit-dial (RDD) sample of non-institutionalized, English-speaking adults, aged 25-74, selected from working telephone banks in the United States. The survey was conducted during 1995 and the database made available electronically by the Inter-university Consortium for Political and Social Research (ICPSR) as a transportable file provided as SPSS and SAS export files. Variables within the data files were recoded to ensure respondent anonymity. The telephone interview of 4242 respondents lasted an average of thirty minutes and mailed questionnaires took an estimated average of an additional two hours to complete. The RDD screening was attempted on 20,000 households. Table 1 provides the sample disposition prior to an attempt to convert refusals into usable interviews by offering additional incentives.

The most common reason for an incomplete screen was due to a non-working number (44.1% or 5242). The most common reason among complete screens for an unusable interview was the 44.9% (n=3636) who were ineligible due to age restrictions (i.e., no one available within the 25 – 74 year age range or the eligible respondent was terminated to maintain probability sampling).

TABLE 1: MIDUS Sample Disposition Prior to Refusal Conversion

Screening Completed (n=8100 or 40.1%)	Totals (%)	Screening Not Completed (n=11,900 or 59.5%)	Totals (%) (n=20,000)
Completed Interview:			
Usable	3323		
Unusable	2		
Total	3325 (41.1)		
Appointment not completed	131 (1.6)	No contact	1246 (10.5)
Refused:			
Prior to interview	932	Non-household	2743 (23.1)
After interview	78	Non-working number	5242 (44.1)
begun	1008 (12.4)	Total	7985 (67.1%)
Total	(12.4)		
Total Eligible	4464 (55.1)		
Ineligible:			
No one 25 - 74 years	988	Ineligible:	
Respondent age terminated	2473	Language problem	362
Language problem	71	Circumstantial	154
Circumstantial	104	Appointment missed	66
Total	3636 (44.9)	Refused	2087
		Total	2669 (22.4)

A total of 5676 people were eligible overall, for an initial telephone response rate of 70.0% (3971/5676).

Sample representation was increased by using a series of weights adjusted by the MIDUS investigators for differences in the probability of selection and differential non response. They developed a total of six weights and the product of the weights was used to create a final summary weight. Each telephone number was classified according to census area, age group, race, education, and income. These variables were analyzed to help predict variation in survey cooperation and probability of response was applied to

each type of respondent. Success in obtaining a listing was negatively associated with neighborhood proportions of Hispanics, positively associated with neighborhood proportions of young adults (age 0 – 24 years), and negatively associated with any household in the Northeast section of the United States. Thus, greater population representation was achieved with this adjustment. In addition, the sample was also weighted to achieve equal numbers of men and women in each of five decades of age. Younger women in small households were much more common than older men. Therefore, the probability of rejecting women in younger age groups (25 – 34 years) was much greater than for men in older ages (65 – 74 years). However, a random selection process was used to reject these more abundant interviews. A consistent selection probability sampling was always used to guarantee that easy-to-reach and hard-to-reach respondents had the same probability of being recruited into the sample. This would not have been the case if a non-probability quota design had been used. Additional attempts and incentives were utilized to increase the likelihood of a completed survey among those with a low probability so as to minimize bias.

This weighted sample is as representative as possible regarding the demographic variables of gender, race, marital status, and age. Age was collected as a continuous variable but reported here in groups for comparison to the national dataset. The weighted sample leans more heavily to males because older men were intentionally over sampled to account for their differing population proportions and for the tendency of men to have a lower probability of agreeing to be in surveys than women.

Of the 4464 eligible interviews, an 86.8% conditional response rate was observed for mail surveys providing a final sample of completed, matched telephone and mail

surveys of 3682. Post stratification revealed that the resulting MIDUS weighted sample matched much more closely with the national population than the original un-weighted sample (Table 2).

TABLE 2: Comparison of MIDUS Sample and National Population Characteristic Proportions

Characteristic	Population	MIDUS Sample	
		Un weighted	Weighted
Region:			
Northeast	20.6	18.0	18.7
Midwest	23.7	27.4	25.1
South	34.1	35.2	37.7
West	21.6	19.5	18.4
Gender:			
Male	48.3	48.5	43.5
Female	51.7	51.5	56.5
Race:			
White	84.8	87.3	84.1
Black	11.2	6.1	10.8
Others	4.0	6.5	5.1
Age:			
25-34	27.6	20.8	26.0
35-44	27.0	24.2	27.8
45-54	19.2	24.0	19.1
55-64	13.9	19.9	15.2
65-74	12.2	11.1	11.8
Education:			
< 12	15.8	10.0	13.2
12	36.4	29.3	38.3
> 12	47.8	60.8	48.5
Marital Status:			
Married	67.5	64.0	68.1
Not married	32.5	36.0	31.9

Participating respondents were queried in the initial telephone interview and responded to a mail questionnaire. The main dataset contains responses from the survey of 4,242 respondents. They were asked to provide extensive information on their physical and mental health throughout their adult lives, and to assess the ways in which their

lifestyles, including relationships and work-related demands, contributed to the conditions experienced. Histories of physical ailments, treatment and/or lifestyle behaviors, and lifestyle changes were obtained with responses on how these factors affected the respondent's physical and mental wellbeing. Additional questions addressed the respondents' sense of control over their health, awareness of changes in one's medical condition, commitment to healthy behaviors, and experiences with nontraditional remedies or therapies. Information on work histories, on significant others, on physical and emotional demands, and on how their personal health correlated to their jobs were also elicited. Respondents were also asked to consider their personal feelings of accomplishment, desire to learn, and sense of control over their lives. Background information on each respondents included age, gender, education, religion, marital status, employment status, age of children, household income, race, ethnicity, sexual orientation, height, weight, insurance coverage, spouse's employment, and parental histories.

The data used for this evaluation came from the 86.8% or 3690 respondents who also returned the mail survey. Because the measure for chronic illness was obtained from the mailed questionnaire, this analysis was conducted on the 3690 respondents completing both the telephone and mail survey. The subset of respondents not completing the mail survey differed significantly in some characteristics from those who completed both. Those who did not return the mailed survey were significantly younger (mean 42 years vs. 47 years), more likely to be male (56% vs. 50%), less likely to be married (49% vs. 63%), and less likely to have a high school degree (56% vs. 63%). (Table 3).

TABLE 3: Comparison of Respondents Returning and Not Returning the Mailed Questionnaire

Percents (unless otherwise noted)	Returned Mail Surveys (n=3690)	Did Not Return Survey (n=552)	Chi-square (p-value)
Age (mean, sd)	47.0 (13.25)	41.9 (13.32)	8.4 (<.001)
Gender: Male	50.0	56.0	6.8 (.009)
Female	50.0	44.0	
Working now: Yes	61.4	39.3	0.4 (.51)
No	38.0	59.6	
Missing	0.6	1.1	
Marital Status:	63.3	48.6	42.6 (<.001)
Married	36.7	51.4	
Not married			
Education:			9.7 (.002)
<=H.S. degree	37.3	44.2	
> H.S. degree	62.7	55.8	

Because the group not returning the mail survey differed significantly on demographic parameters, they are likely to differ on other characteristics compared to those who did return the survey. Therefore, they could significantly bias the resulting estimate regarding chronic illness, distress, and alternative treatment use. The analysis for this study thus concentrated on the 3690 who participated in both the telephone interview and mail survey.

Strengths and Limitations of Using MIDUS

The use of the MIDUS Survey to address the question of mental distress among those with a chronic illness has several strengths. The survey sample is a nationally representative sample with a broad range of ages among families dealing with an ill adult and represents a broad range of chronic illnesses or conditions. This dataset is thus representative of the general population and provides a great deal of generalizability of

findings. The MIDUS survey covers a broad range of chronic illnesses or conditions and is therefore more representative of all those struggling with a chronic illness. Like other national datasets, the MIDUS total sample has a small proportion of minorities (5%). However, the proportion of African American minorities in each subgroup is similar (7.5% versus 5.7%).

Respondent report of chronic illnesses or conditions is a strength of the MIDUS study. Chronic illness was quantified by separate items for a broad range of chronic conditions. The conditions defined as chronic was clearly labeled as persistent illnesses or conditions that require ongoing medical care. Items included commonly understood illnesses as asthma, diabetes, and HIV but also included less commonly considered conditions as arthritis, joint disease, and migraines. A total of 29 illnesses and conditions are considered and therefore would validly classify anyone with a persistent chronic condition into the group of those with chronic illness or chronic condition.

The MIDUS Survey also has strengths for addressing our hypothesis because of the measures included in the survey. The measures for depression and perceived control have previously been tested and validated in population studies and the scales developed for this analysis resulted in reliability coefficients greater than 0.80. The use of depression and perceived control inventories to identify respondents at risk for chronic and daily stress has been extensively tested in national population studies as a valid and reliable tool for screening depressive and distressed states (Mirowsky 1994). Although clinical diagnosis of depressed states is more specific, inventories can reveal patterns of correlation that are obscured by diagnostic symptoms (Mirowsky 1994). By utilizing items from the inventories in the MDUS Survey dataset, patterns of distress among

families may be distinguished according to the presence of a chronic illness that might otherwise be missed using diagnostic symptoms found in other datasets.

Use of the MIDUS Survey to test the hypothesis that personal distress differs according to the presence of illness has some limitations. That minority discrimination is not the focus of the MIDUS survey is one limitation. The hypothesis results could suffer from a lack of power since a small sample of African Americans with chronic illness (n=163) participated in the study and even fewer reported having no chronic illness (n=63). This represents only 5.3% of the total sample of 4242 respondents.

Discrimination in obtaining healthcare services is particularly acute for Black minorities and because minorities represent a small proportion of this survey, reported discrimination among them represents only 7.5% (n=17) of the 230 respondents identifying themselves as a black minority. Reported discrimination in any service is, however, a much larger number. There were 175 or 76% of the 230 Black respondents reporting day-to-day discrimination in the receipt of any service.

Depression indexes include both psychological and somatic symptoms in identifying people at risk for depressed states. Using a combined index then can create problems from somatic symptoms that may imitate depression but actually be indicative of physical illness. However, questions identifying somatic symptoms were removed from the final depression index of this study. The depression screening questions used for the scale in this study (presence of chronic sadness, hopelessness, or unworthiness) have been shown to be accurate in identifying those with chronic stress intense enough to cause a negative impact on mental health (Mirowsky 1994). The index for perceived control in MIDUS infers only daily stress from the demands of life in general. Ideally,

questions specific to illness-related demands and dual role demands would have been measured. However, the general perceived control index does not discount symptoms that coincide with stressors specific to dual role and illness that may be causing the stress.

The use of traditional measures for socio-economic status is a liability in this survey. Household annual income was reported separately for respondent, spouse, or other income earner in categories of one thousand units up to \$20,000. The categories are then reported only by units of 5000 up to \$50,000 after which they become units of 25000 up to \$100,000, units of 50000 up to \$200,000 and units of 100000 thereafter. Accurate comparisons are skewed toward the lower income brackets and adding all income earners of a household obscures calculated means. Therefore, it was necessary to use respondent income and measures of perceived financial situation (i.e., belief that one has enough money to meet needs and level of difficulty in paying bills) to compare financial SES.

Caution must also be observed in the ability of this database to suggest associations that are true cause and effects. The design of the MIDUS Study is cross-sectional and any associations may be confounded by unmeasured factors or by selection biases. Temporal bias is a particular threat to the validity of any finding from the current analysis. For example, those with a tendency toward depression or anxiety may be more likely to categorize acute illnesses as a chronic condition. However, they are just as likely to misclassify a chronic condition. For example, asthma and diabetes often go undiagnosed and untreated for some time among persons who shun the health care system because their own mental problems may make them more likely to be unaware of a chronic condition early on. However, the proportion in the study that this would

represent is likely small and the many strengths of using MIDUS for this analysis outweighs these few limitations.

Description of Measures

Abbreviated versions of the depression, daily stress, and perceived control scales were applied for this analysis. The scales were modified to provide the best fit and items with high response rates and high construct validity were retained within each scale.

Dependent Variables

Depression: This was inferred from the psychological attributes of sadness, hopelessness, worry and feeling that everything was an effort defined as the presence of any one of these psychological attributes at some point within the previous 12 months. Responses were dichotomous, yes or no, as to whether they were ever present for two weeks or more during the previous year. The 4-point scale of excessive worry was based on a relative measure of whether the respondent felt that in the previous 12 months they worried more, less, about the same, or not at all compared to most people. The depression index also used the positive psychological attributes such as cheerfulness, happiness, peacefulness, and satisfaction with life which was then reverse coded. These were defined as the frequency of whether such feelings were experienced all of the time, most of the time, some of the time, or not at all during the previous 30 days.

Face validity identified 38 potential items for a depression index including other psychological attributes such as loss of interest, thoughts of death, feeling irritable and somatic attributes of loss of energy, loss of appetite, trouble sleeping, restlessness, and aches or pains. These other psychological attributes and the somatic attributes were dropped from the final index due to poor reliability with the above attributes. The alpha

score for the original 38 items was poor, reaching only 0.2401. Removal of the other psychological attributes (e.g., loss of interest) and of the somatic attributes resulted in a Cronbach's alpha score of 0.5993. The inter-item correlation is only moderate because the somatic attributes have lower validity in identifying depression since they can be just as common in physical illnesses and conditions as they are in psychological conditions. The response items to each positive attribute had to be transposed due to the inverse wording of the questions compared to depressed questions. Inversing the positive attributes of happiness, peacefulness, and satisfaction with life and adding them to the retained psychological attributes resulted in a final reliability coefficient of 0.89. The final 11-item index was significantly correlated across the items, ranging in correlation coefficients of 0.25 to 0.65 (p-value <0.0001).

The items in the retained index were averaged over all eleven questions with a 5-item Likert scale from 1 (least depressed) to 5 (most depressed). Overall frequencies resulted in 5% indicating most depressed and 18% indicating not depressed (Table 2).

TABLE 4: Distribution of Depression Responses

How Depressed	Sample %	Mail Responders N=3680	Non Responders N=562	X ² - Statistic (p-value)
Most		1.6%	28.8%	101.4 (<0.001)
Somewhat		10.2%	66.5%	
A little		66.6%	0.7%	
Not much		21.2%	3.0%	
Not at all		0.4%	0.7%	
Missing		1	1	

Alternative Therapy Use: This was measured by the summation of a list of responses for potential uses of alternative therapies (Appendix A). The survey listed 20

items identified to the respondent as an alternative therapy. Items were expressed as presence of ever-use behaviors using a dichotomous scale (yes/no use) and included such common therapies as mega-vitamins, herbal supplements, special diets, special exercises, prayer, and chiropractic visits. They also included less familiar alternatives such as acupuncture, biofeedback, energy healing, hypnosis, and meditation. Additional questions included the practice of using sedatives, stimulants, or prescription painkillers without a prescription or in a dosage beyond that prescribed. These items are valid constructs for this examination because people who are stressed and who may perceive the standard health care system as failing them are more likely to go to such lengths as using these medications when not prescribed specifically by a physician for their stress. The reliability coefficient for the 20-item scale was 0.6886. Removal of any one of the items did not change the coefficient, the Cronbach's alpha score ranged between 0.67 and 0.69 regardless of items removed. Therefore, all 20 items were retained for the final scale.

The scale of each alternative therapy was dichotomized as to whether the therapy was ever used or not used by the respondent. The scales were summed and this scale item ranged from 0 (have never used any one) to 13 (have used these at least once). A cumulative total of 99% was reached for those reporting the use of 8 or less therapies. The distribution was skewed toward zero with 44.7% reported never having used an alternative therapy. However, a majority (54.8%) did report every using one or more type of alternative care (Table 5).

TABLE 5: Distribution of Alternative Therapies Used

Sample Types Used %	Mail Responders N=3680	Non Responders N=562	X ² - Statistic (p-value)
None	44.7%	99.5%	100.6 (<0.001)
One	23.2%	0.2%	
Two	13.5%	0.2%	
Three	7.9%	0%	
Four or more	10.5%	0.2%	
Missing	0	562	

Independent Variables

Presence of Chronic Illness: The presence of a chronic illness was defined specifically for respondents by a list of conditions and illnesses that are persistent and require ongoing medical care. Thus, chronic conditions are clearly differentiated from acute self-limiting conditions. The response for each item on the list is dichotomous, either present or not. The full list is provided in Table 9 (p. 56). Chronic illness was initially measured in MIDUS from a broad range of conditions, several of which could be considered less than chronic. Some of the listed conditions may either be self limiting or symptoms may be so minimal that they do not require encounters with the health care system. For example, hay fever or varicose veins which are included in the list of chronic conditions may manifest with minimal symptoms requiring only occasional trips to the drug store rather than to a healthcare professional. Conditions such as gall bladder problems or hernia can manifest acutely and result in surgery that quickly corrects the condition and therefore not require long term encounters with the healthcare system. The MIDUS survey did not distinguish between current long term suffering and treatment for the condition in the past year. Measurement in this way may have obscured the effect of

chronic illness. Therefore, the regression model was retested using a revised list of only serious, long term chronic illnesses. The conditions included for this analysis were sciatica, bone disease, hypertension, bladder problems, asthma, coronary heart disease, diabetes, migraines, thyroid disease, autoimmune disease, cancer, and stroke. The other, self-limiting conditions were included into the non-chronically ill subgroup.

However, whether a condition is chronic or self limiting may differ across individuals. Some people may suffer for longer periods and with worse symptoms for a condition than others with the same condition and therefore, one person's chronic condition may be another person's self-limiting condition. Depending on whether the condition is experienced as debilitating or limiting will determine whether a person perceives a need for ongoing treatment and thus multiple, ongoing encounters with the healthcare system. Therefore, a global measure was used to reanalyze the presence of a chronic condition according to the respondent's perception of debilitation of physical health. This perceived health was determined in the MIDUS survey by a Global Health Questionnaire that queried respondents on a 5-point Likert Scale according to whether, in general, they would rate their physical health of the previous year as: poor, fair, good, very good, or excellent.

Perceived Control: This variable refers to self-esteem and labeled perceived control by the MIDUS survey. Indicators included the psychological attributes of the belief that certain actions will achieve desired goals. For example, the belief that one can do anything one desires, that one is responsible for own successes, that misfortunes are the result of own mistakes, and that one is responsible for ones own failures. The inverse of perceived control infers the belief of powerlessness as indicated by feeling helpless

dealing with problems, things being beyond own control, multiple things interfering with own desires, and feelings of little control over problems. These items described perceptions of self control or powerlessness, of managing the present and controlling the future, and of changing one's situation. Items elicited responses from a 7-item Likert scale on the level of agreement for the extent to which the above items described the individual from 1 indicating strong agreement to 7 indicating strong disagreement. Initially, 23 items were identified by face validity for the perceived control scale. An initial Cronbach's alpha score of 0.675 was attained.

Construct validity testing refined the perceived control scale and identified 19 items of higher reliability. This group of items resulted in an adjusted Cronbach's alpha of 0.7899. Items contributing to the initial lower score were those reporting on how pleased with life one was, how in charge of life one felt, and whether the future depended mostly on oneself. Six items elicited responses on whether the respondent liked their personality, was pleased with how things have turned out, and whether they believe they are good at managing daily life. Because these items tap less into feelings of control than feeling overwhelmed with demands, they were removed. Removal of these items resulted in an improved reliability coefficient of 0.865 for a final 14-item index. Items retained were those eliciting level of agreement about perceived powerlessness as in feelings of helplessness, feelings of powerlessness to make changes, and feelings of a lack of control over life. The final 14-item index was significantly correlated across the items, ranging in correlation coefficients of 0.29 to 0.50 ($p\text{-value} < 0.0001$).

The score in the retained index was averaged over all fourteen items. Response items ranged from 1 (strongly agree that one is powerless) to 7 (strongly disagree). The

frequencies resulted in a normal distribution (mean= 4.7, median= 5.0, and mode= 5.0) with approximately 13% indicating lower control and 22% indicating highest control (Table 6).

TABLE 6: Distribution of Perceived Control

Sample High Control %	Mail Responders N=3680	Non Responders N=562	X²- Statistic (p-value)
Strongly Agree	0.8%	0%	110 (<.0001)
Somewhat Agree	4.3%	0%	
Agree	11.3%	0.5%	
Neutral	23.1%	0.4%	
Disagree	32.7%	0.2%	
Somewhat Disagree	25.9%	0.4%	
Strongly Disagree	1.4%	0%	
Total	3662	8	
Missing	18 (0.5%)	554 (98.6%)	

Quality of Support indicators included respondent report of perceived level of spouse or partner caring, appreciation, understanding and reliability. Six measures were identified by face validity for a quality of support scale. Respondents were asked to rate the quality of their relationship with their partner on a scale of 1 to 5 (1=excellent, 5=poor). Four questions asked respondents to report how much their partner cared for them, understood them, appreciated them, and how much they could rely on their partner for help. These scales ranged from 1 to 4 (1= A lot, 2= Some, 3= A little, and 4= Not at all). The sixth question asked respondents to report on whether their partner makes too many demands using a scale of 1 to 4 (1=often, 4=never).

Construct validity testing refined the six question scale, with a Crohnbach's reliability score of 0.79, to a five question scale that included the first five items discussed above. Removal of the question on amount of demands the partner places on

the respondent resulted in retaining the five questions into a single indicator of support quality which had a final Cronbach's alpha of 0.90. The items had high correlation ranging from a correlation coefficient of 0.58 to 0.72. The frequencies in the resulting 4-item Likert scale were similar between the sub sample and total sample (Table 7).

TABLE 7: Distribution of Quality of Support

Sample Quality of Support %	Mail Responders N=3680	Non Responders N=562	X²- Statistic (p-value)
A lot (Excellent)	0.4%	0.2%	115 (< .0001)
Some (good)	57.3%	0.9%	
A little (Fair)	9.2%	0.2%	
None (Poor)	2.8%	0%	
Total	2567	7	
Missing	1113 (30.2%)	555 (98.8%)	

Discrimination in obtaining medical services was measured by respondent report of being denied care or provided inferior medical care due to gender, race, or ethnicity discrimination. A total of 974 respondents in the total sample reported denied or inferior care one or more times in their life when seeking medical care. There were 533 (12.6%) of the total sample reporting such discrimination due to race or ethnicity and an additional 459 (10.8%) reporting denied or inferior care due to gender discrimination. In addition, the impact of discrimination was measured by two questions that asked respondents how much discrimination interfered with life and how much harder life was due to discrimination. Both were based on a 4-point Likert scale (1=A lot, 2= Some, 3= A little, and 4= Not at all). The two questions were summed and then a correlation coefficient calculated of 0.985 and a Cronbach's alpha score of 0.99. The frequency of items was similar between the total sample and sub sample (Table 8).

TABLE 8: Distribution of Discrimination

Sample Med Discrimination %	Mail Responders N=3680	Non Responders N=562	X²- Statistic (p-value)
Denied or Inferior Care:			101 (<.0001)
Ever	2.9%	0.5%	
Never	90.0%	1.2%	
Total	3418	10	
Missing	262 (7.1%)	552 (98.2%)	
General Discrimination			110 (.0001)
Interferes very much	2.3%	0%	
Interferes Somewhat	4.9%	0.4%	
Interferes a little	13.8%	0.4%	
Interferes not at all	26.5%	0%	
Total	1749	10	
Missing	1931 (52.5%)	552 (98.2)	

Plan of Analysis

This examination compared cases (respondents with a chronic illness) and a comparison group (respondents without chronic illness) across all descriptive and outcomes variables using the Chi-square test for nominal categorical-level variables and the Wilcoxon two-sample test for continuous variables. Variables relevant to the research question were explored descriptively and included the demographics of the respondent (i.e., age, race, marital status, and socio-economic status), discrimination (general and specific to healthcare access), illness prevalence, perceived control, daily stress, depression, and use of alternative therapies. Descriptive analysis was also conducted on variables relevant but not central to the research question and included number of children, and quality of partner support. These were treated as control variables.

Multiple regression analysis was conducted on models for each dependent variable of daily stress, depression, and alternative therapy use. These dependent

variables; chronic stress (14 – 98), depression (11 – 51), and alternative therapy (0 – 19) have been scored so that lower scores reflect greater stress and psychological distress. Variables regressed for each dependent variable considered central to each model included cases (chronic illness), lifetime discrimination (1 - 7), level of perceived control, and socioeconomic status. Variables controlled within each model included prior use of health care services, number of children in the family, marital status, and quality of the marriage (i.e., functional support). Predictor variable arrangement differed for each model. Predictor variables included chronic illness, discrimination, perceived control, and support. A final linear regression model was constructed that estimated the significant contribution of discrimination to the relationship of case status in predicting stress and psychological distress. The following assumptions were included in the model: the relationship between each dependent variable and independent factors is linear, the distributions of the independent variables have equal variances for each value of the dependent variable, and the values for each explanatory variable are independent across the dependent variable. The coefficient of determination (R^2) was used to describe the amount of variation explained by the model of chronic illness on each dependent variable. A multiple linear regression model was developed to predict depression and anxiety based on the presence of chronic illness (1=has a chronic illness, 0=no chronic illness); perceived control (1=feel highly powerless to 7=feel highly empowered); and the quality of support from a significant other (1=great deal of positive support to 4=no support). For alternative therapy, a multiple logistic regression model was used where reported use of alternative therapy (1=any use, 0=never used) was predicted based on the

presence of chronic illness, perceived control, and quality of support as above. The model developed is demonstrated by the formula:

$$Y = a + bX_1 - bX_2 - bX_3$$

Where:

- Y=dependent variable (depression, anxiety, or CAM)
- X_1 is the presence/absence of chronic illness in the respondent,
- X_2 is the level of personal agency or perceived control score,
- X_3 is the level of support from a significant other.

Covariates controlled within the model include gender, race, education, employment, insurance, income, and having children at home. A stepwise model was employed where:

Model # 1: Dependent variable (depression/anxiety or CAM) modeled on chronic illness.

Model #2: Dependent variable on chronic illness and perceived control.

Model #3: Dependent variable on chronic illness, perceived control, and support.

Model #4: Dependent variable on chronic illness, perceived control, quality of support, and discrimination in medical care.

Model #5: Dependent variable on chronic illness, perceived control, and quality of support, and discrimination in general.

Model #6: Dependent variable on chronic illness, perceived control, and quality of support, and both discrimination factors.

Model #7: Interaction term between medical discrimination and chronic illness.

Model #8: Interaction term between perceived discrimination and chronic illness.

Interaction terms were built for discrimination in the receipt of medical services (Discr1) and perceived discrimination (Discr2) and chronic illness. The product of perceived discrimination (measured as interferes with life 1= A lot --- 4=Not at all) was computed with chronic illness (measured as global health 1 = poor ---- 5= excellent). A second interaction term was created measured as the number of times discriminated receiving medical care and chronic illness. The scale levels indicating don't know or missing (numerical values of 8 or 9) were eliminated. The resulting scaled levels created for the interaction term numbered from 1=worst up to 20 = Best (excellent health and no discrimination). The interaction term was entered separately in each regression model in the seventh and eighth step for each predictor, depression and alternative medicine. The product terms for each are labeled Discr1 * illness and Discr2 * illness.

Summary

Because chronic illness includes the proliferation of multiple stressors, a chronic illness can lead to significant psychological distress. This proposal has suggested that within the framework of the stress proliferation model, a chronic illness is a significant predictor of distress. Coping through utilization of alternative therapies was proposed to mediate the effect on distress. Furthermore, the addition of discrimination was hypothesized to add significantly to the prediction. A multivariate regression analysis examined the contribution of chronic illness, to depression, anxiety, and CAM.

CHAPTER THREE

RESULTS

A total of 3680 completed both the telephone interview and the mail survey. Of these, 728 (19.7%) were being treated for depression or anxiety within in the last nine months and were eliminated from the final analysis because there was no way to determine the duration or effectiveness of treatment.

Total MIDUS Survey

N=4242



Mail Survey Completed

Returned Mail Survey

N=3890

Not Returned

n=552



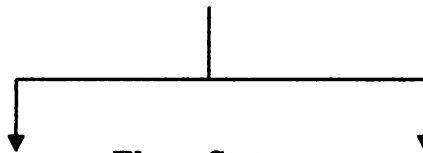
Depression/Anxiety

Not currently under treatment

N=2952

Currently under treatment

n=728



Illness Status

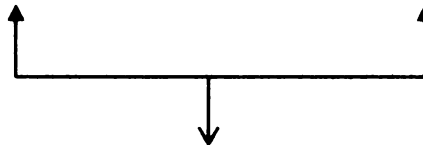
Chronic Illness

n = 2095

No chronic illness

n = 839

missing = 18



Final n = 2934

FIGURE 3: Respondent Sample Flowchart

Chronic illness was reported by 2095 (71.4%) and 839 (28.6%) reported no chronic illness (Figure 3). Among the respondents reporting a chronic illness, only 21% had a single condition. Two or more conditions were reported by 56% of ill respondents. No chronic illness was reported by the remaining 839 or 28.6%. Table 9 presents the prevalence of each reported chronic illness. The most common were bone disease (17.7%), hypertension (16.6%), and back problems (16.5%).

Table 9: Prevalence of Reported Chronic Conditions in Final Sample (n=2934)

<u>Condition</u>	<u>Percent</u>	<u>Number</u>
Bone or joint disease	17.7	518
Ulcer or stomach problems	16.8	493
Sciatica or lumbago	16.5	484
High blood pressure	16.6	486
Hay fever	14.1	414
Urinary or bladder problems	11.1	327
Asthma, bronchitis, or emphysema	10.5	307
Persistent foot trouble	9.9	291
Piles or hemorrhoids	9.4	276
Persistent skin trouble	9.4	277
Persistent trouble with teeth	8.1	237
Migraine headaches	7.3	215
Chronic sleeping problems	7.0	205
Cancer	6.5	190
Gum or mouth trouble	6.0	175
Diabetes or high blood sugar	4.9	145
Constipation	4.0	117
Thyroid disease	3.5	104
Other lung problems	2.6	77
Hernia or rupture	2.2	66
Gall bladder trouble	1.7	51
Alcohol or drug problem	1.6	46
Neurological disorders	1.6	47
Heart attack	1.4	42
Autoimmune disorders	1.0	28
Varicose veins requiring treatment	0.9	25
Stroke	0.6	17
AIDS or HIV infection	0.2	6
Tuberculosis	0.2	5

The demographic profiles for each group (those with chronic illness and those with no illness) are presented in Table 10.

Table 10: Comparison of Demographic Characteristics among Those with and those without a Chronic Illness (%)

Characteristic	No Illness (n=839)	Chronic Illness (n=2095)	Chi square #
Age: mean (SD)	43.2 (12.6)	48.6 (13.5)	9.97 **
Gender: Male	57.3	51.7	7.6**
Female	42.7	48.3	
Race: White	83.8	85.1	1.5
Minority	13.7	12.0	
Missing	2.5	3.0	
Marital Status:			0.0
Married	65.8	65.8	
Not married	34.2	34.2	
Education:			4.4*
< H.S.	6.2	9.3	
H.S./GED	27.6	28.8	
Some College	23.1	22.3	
College degree	42.9	39.7	
Employment:			30.9**
Work now	70.3	59.0	
Not working	24.6	34.6	
Missing	5.1	6.4	
Income: < \$10,000	21.2	30.2	33.7 **
\$10 - \$19	14.2	15.1	
\$20 - \$49	31.6	26.4	
\$50 - \$75	21.8	16.4	
> \$75,000	11.2	11.9	
Insurance: Yes	82.6	81.3	0.64
None	17.4	18.7	
Any Kids: Yes	45.5	34.7	29.6 **
No	54.5	65.3	

* p< 0.05, ** p< 0.01, # age significance test by Student t-Test.

The two groups were similar in marital status, race/ethnic makeup, and insurance status. However, the groups did differ significantly on several characteristics. The chronic illness group was composed of more females (48.3% vs. 42.7%) with a slightly higher group mean age (48.6 yr vs. 43.2 yr). The ill group had fewer currently employed (59.0% vs. 70.3%), fewer current smokers (38.2% vs. 43.5%), a greater proportion in low income bracket (30.2% reporting < \$20,000 vs. 21.2%), lower educational attainment (6.2 % vs. 9.3% < HS degree), and fewer with children living at home (34.7% vs. 45.5%). These factors were statistically controlled in the multivariate analysis.

Univariate Analysis

Univariate analysis was conducted according the dichotomized variable of chronic illness (presence or absence). Table 11 presents the mean score findings. The chronic illness group had significantly more respondents meeting criteria for depression or anxiety and more reporting use of CAM.

Table 11: Univariate Analysis of Proportion with the Outcome by Illness Group Status.

Dependent Variable (Dichotomous: % yes)	Chronic Illness (n=2095)	No Illness (n=839)	Chi-square
Depression	7.8	4.6	9.2**
Generalized anxiety	1.3	0.8	1.1
CAM	55.2	39.1	62.3**

*p<0.05, **p<0.01

Mean scores for perceived control, quality of support, reported discrimination generally, and discrimination with medical services specifically was compared between the chronic

illness group and the non-ill group. Table 12 presents the results. The groups differed only in perceived control with the chronically ill reporting lower control ($p < .01$). The ill group also reported more times discriminated in medical care but this was not significantly due to a few reporting a high frequency of discriminations.

Table 12: Univariate Analysis of Mean Values for Each Independent Variable by Illness Group Status.

Independent Variable Mean score (SD)	Group Status		
	Chronic Illness (n=2095)	No Illness (n=839)	t-statistic
Perceived control	4.76 (1.12)	5.06 (1.06)	6.8**
Quality of support	2.17 (0.44)	2.15 (0.48)	-1.7
Discrimination			
Interferes with life	1.50 (0.76)	1.53 (0.81)	-0.63
Discrimination medical (mean # times in life)	0.13 (2.4)	0.3 (.23)	-1.8

Mann Whitney-U t-Test for non-parametric data.

* $p < 0.05$, ** $p < 0.01$

Mental Health Outcomes Analysis

Unstandardized coefficients and their corresponding p-values are reported. Table 13 presents the regression of the mental health and behavior outcome variables on control variables. The table demonstrates that chronic illness is a significant predictor of both mental health outcomes and health behaviors. Respondents in the chronically ill group were significantly more likely to report depression and to use alternative medicine than respondents who did not have a chronic illness ($p < .001$). Insurance was highly significant for depression ($p < .01$) but not a predictor of anxiety or CAM use. Respondents without

health insurance were more depressed than those with insurance. Age was associated with depression. Younger respondents were more depressed than their younger counterparts. Gender was a significant predictor of alternative therapies (CAM). Females trended to be more depressed and anxious, but not significantly so, and significantly more likely to use alternative therapies. Education was a predictor of CAM. Higher education was significantly associated with more CAM use ($p < .01$).

Table 13: Regression of Chronic Illness and Other Predictors on Outcomes.

		Depression	Anxiety	CAM
Gender	(0=male)	.062	.084	.340*
Age	(years)	-.005*	-.002	-.004
Education	(1=grade)	-.063	-.048	.504**
Employed	(0=Yes)	-.012	-.018	.007
Income	(1=<\$10000)	.012	-.015	.078
Any kids	(0=none home)	-.019	-.022	-.103
Insurance	(0=no ins)	-.160**	-.112	.083
Race	(0=White)	-.020	-.011	-.078
Chronic ill	(0=not ill)	.091*	.026	.440**
Constant		3.1	.316	-.297
R^2		.03	.01	.03
n		2674	2674	2674

Unstandardized, beta coefficients reported

* $p < .05$, ** $p < .01$

Table 14 – 16 presents regression results for depression, anxiety, and alternative therapy use. The variables were added in six steps. The first consisted of control variables only. Chronic illness was considered an independent predictor and added next. The effects of perceived control, the quality of social support, and the experience of discrimination were considered to mediate or modify this effect so each successively added next. The final step added all predictor variables to the model. Table 14 presents the regression results of predictors on depression.

Table 14: Regression analysis of Predictors on Depression.

	Demog.	Chronic	Control	Support	Discr1	Discr2
Gender	0.064	0.062	0.051	0.036	0.037	0.040
Age	-.004*	-.005*	-.006**	-.006**	-.006**	-.006**
Education	-.067	-.063	-.022	-.020	-.021	-.023
Employmt	-.012	-.012	-.007	-.005	-.005	-.005
Income	0.011	0.012	0.027	0.026	0.027	0.028
Kids	-.019	-.019	-.050	-.069	-.070	-.071
Insurance	-.158**	-.157**	-.139**	-.137*	-.133*	-.131*
Race	-.020	-.020	0.006	0.001	-.002	-.030
Chronic ill		0.091*	0.047	0.059	0.057	0.061
Control			-.124**	-.110**	-.110**	-.105**
Support				-.144**	-.145**	-.140**
Discr 1					0.004	0.004
Discr 2						0.052*
Constant	3.23	3.17	3.7	3.4	3.4	3.3
R ²	0.02	0.05	0.07	0.08	0.10	0.11
N	2674	2674	2667	1945	1867	813

*p<.05, **p<.01 (Unstandardized, beta coefficients reported)

Chronic illness was initially a significant predictor of depression. Respondents reporting a chronic illness were more depressed than those with no chronic illness ($p < .05$). *The primary hypothesis that chronic illness increased the risk of depression was supported in this model.* However, the effect of chronic illness on depression was weak to begin with and disappeared with the addition of perceived control. increased, the likelihood of depression decreased ($p < .01$). Its effect became stronger with the addition of perceived control. It remained a highly significant predictor of depression in the final model ($p < .01$). The younger subgroup was more depressed than the older group regardless of illness status (Table 15).

Health insurance coverage was a significant, independent predictor of depression ($p < .01$). Those with insurance coverage of any kind were less likely to be

depressed than those without insurance regardless of age or the other predictors. Its effect was not altered by the addition of chronic illness.

Table 15: Depression Rates According to Control Variable Subgroups.

Group (% Depressed)	Chronic Illness (n=2095)	No Illness (n=839)
Young	7.8%	4.6%
Insured	10.2**	5.7
Uninsured	9.3**	4.6
Old	4.9**	2.2
Insured	4.9	2.7
Uninsured	4.9	00

*p<.01 for illness status, **p<.001

Table 16 presents depression rates according to the independent variables. Personal agency as measured by perceived control was a significant independent predictor of depression ($p < .01$). Low control was associated with higher depression regardless of illness status. The addition of perceived control to the model analysis eliminated the significant effect seen for chronic illness. Perceived control modified the magnitude and significance of chronic illness such that chronic illness was no longer a predictor of depression in the presence of control. Correlation analysis revealed a statistically significant, negative association between chronic illness and perceived control ($r = -.18, p < .01$). Low perceived control was associated with the presence of chronic illness. Therefore, control was shown to mediate the effect between chronic illness and depression scores. *The secondary hypothesis that personal agency mediates the effect of chronic illness on depression was supported by this analysis.*

Social support was also a highly significant predictor of depression. The presence of a supportive partner was a protective factor in depression. Higher rated support was significantly associated with less depression ($p < .01$). Respondents with a very supportive partner were less likely to be depressed and this effect remained highly significant in the final model.

The protective effect of insurance coverage diminished somewhat with the addition of support but remained significant ($p < .05$). As the quality of the support increased, the importance of insurance as protection from depression diminished. Support, entered the model and remained throughout the analysis, a highly significant predictor of depression ($p < .01$). Greater support equated with less depression.

Protection from depression may be more conditional on personal agency (as measured by perceived control) and the presence of a supportive partner rather than on age per se. Age demonstrated a significant negative correlation with perceived control ($r = -.104$, $p < .01$). Older respondents were more likely to have lower control. In addition, those with low control were more likely to be depressed than those with high control ($r = -.237$, $p < .001$).

The presence of a supportive partner was associated independently with the absence of depression and so having a supportive partner protects against depression ($p < .001$). Age did not correlate with the quality of support ($r = -.023$, $p = .255$). However, perceived control did correlate significantly with support ($r = .201$, $p < .001$). Higher perceived control was associated with greater social support. The combination of higher control and a supportive partner was significantly associated with a lower likelihood of depression even among those with chronic illness.

Sample size was diminished by more than half in the final analysis, dropping from 2674 cases to only 813 in the final model. In general, such a significant drop in number of cases could cause a failure to reach statistical significance due to a lack of power. The introduction of support measures led to a drop in sample size of 729 cases and the introduction of perceived discrimination led to an additional drop of 1132 cases. However, the drop in power is not a major factor in these analyses because the significance level of each independent variable remained consistent throughout each step of the regression model. This lack of impact on estimates was similar for each dependent variable of depression, anxiety, and CAM use.

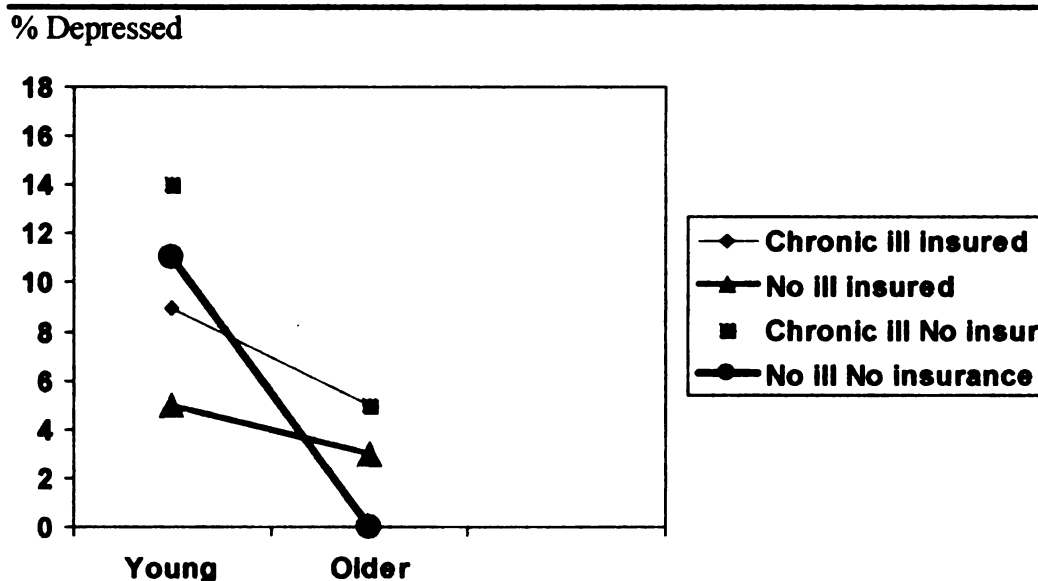


FIGURE 4: Interaction Between Illness and Age.

Although there was an initial main effect of illness on depression, it disappeared with the addition of perceived control. Chronic illness may be associated with low control. Correlation analysis revealed a statistically significant, negative association between chronic illness and perceived control ($r = -.18, p < .01$). Low control was

associated with higher depression regardless of illness status. The addition of perceived control to the model analysis eliminated the significant effect seen for chronic illness (Table 14). Therefore, control was shown to mediate the effect between chronic illness and depression scores.

Table 16: Depression Rates According to Independent Variable

Subgroups.

Group (% Depressed)	Chronic Illness (n=2095)	No Illness (n=839)
Overall	7.8*	4.6
High Control	5.7**	3.6
High Support	4.2**	2.8
Low Support	11.5	00
Low Control	11.7	7.1
High Support	9.8	5.8
Low Support	11.3	10.0

*p<.01, **p<.001

Social support was also a highly significant predictor of depression. The presence of a supportive partner was a protective factor in depression. Respondents with a very supportive partner were less likely to be depressed and this effect remained highly significant in the final model (Table 16).

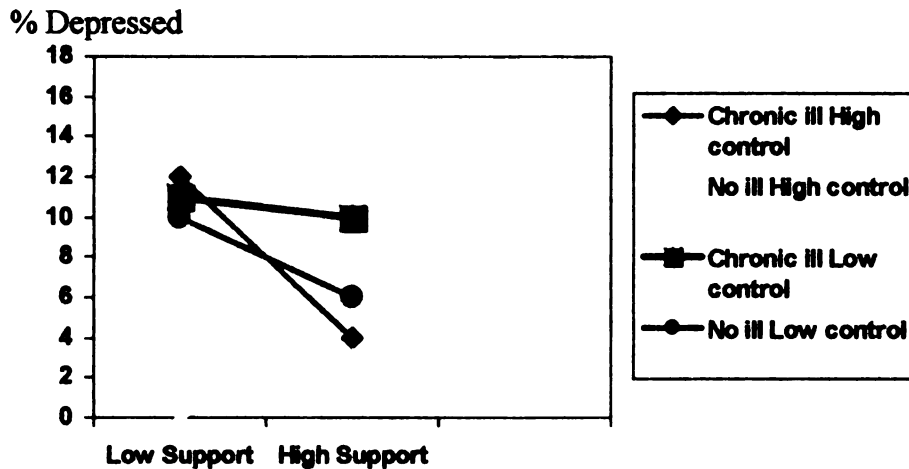


FIGURE 5: Interaction of Illness and Support on Depression.

The experience of discrimination related to medical care services was not at all associated with depression. However, less than 2% of the sample reported having experienced discrimination specific to medical services one or two times in their lifetime and thus has very little variation in measurement for the analysis. Therefore, the effect may be present but not visible in this model. Its addition to the model did strengthen the effect of age on depression. In the presence of discrimination, older age was even more protective against depression.

Discrimination as measured by perceived interference in one's life was a significant, independent predictor of depression ($p = .05$). The more that discrimination was reported to interfere with life, the more likely depression was present regardless of other predictors. Respondents older than 50 years who report discrimination were no more likely to be depressed than those never experiencing discrimination (5.7% versus 5.6%). The younger group, 50 years or less, who have experienced discrimination report the most depression (10.2%). Even when controlling for, insurance, perceived control and

support discrimination remained associated with higher depression scores. Discrimination had a main effect on depression in the presence of illness. Depression rates were significantly higher for those reporting discrimination than for those reporting no discrimination among both the chronically ill and non ill groups (Figure 6). The presence of chronic illness magnified the difference (Table 17). Depression rates were highest for those with a chronic illness and who reported experiencing discrimination ($p < .05$). *The secondary hypothesis that discrimination moderates the risk of depression by chronic illness was supported by the measure of perceived discrimination.*

TABLE 17: Depression Rates among Illness and Discrimination Subgroups.

<u>Group (% Depressed)</u>	<u>Chronic illness</u> <u>(n=2095)</u>	<u>No illness</u> <u>(n=839)</u>
	7.8**	4.6
Discrimination (n=1286)	10.0	5.4*
No Discrimination (n=35)	8.0	00 ^

* $p < .01$ for chronic illness status, ** $p < .001$, ^ $n=10$.

Figure 6 presents the rates of depression according to illness status and subgroups of those who reported any interferences or effect of discrimination on their life compared to those reporting no interference. The number of those reporting the times discriminated according to medical care services was too small to report by subgroups.

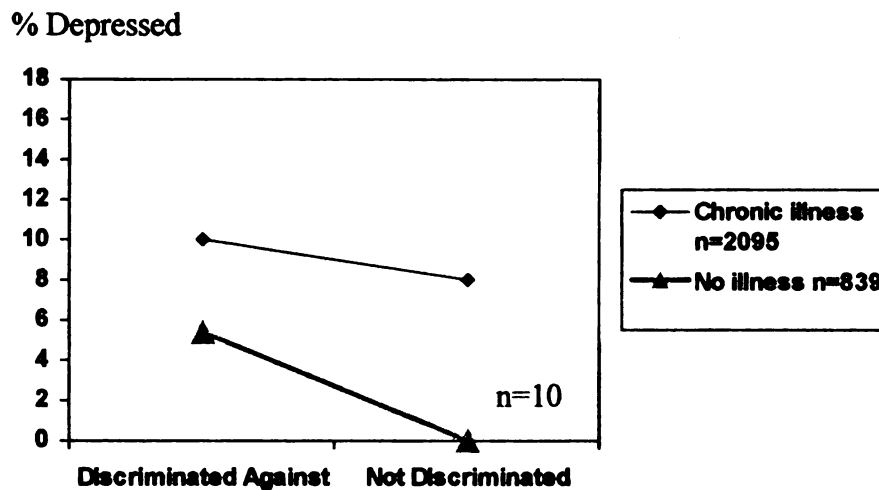


FIGURE 6: Relationship of Chronic Illness, Depression and Discrimination.

The final model was significant for two control variables and three of the independent predictors, explaining 11% of the total variation in depression scores. This model demonstrated that chronic illness is a significant predictor of depression mediated by perceived control and social support and moderated by discrimination.

The model was tested for generalized anxiety to determine whether these same factors would predict anxiety. Table 18 presents the regression of generalized anxiety and its predictor variables. Independent variables in the model failed to show an association with generalized anxiety and together explained little of the variation in scores (1%). Chronic illness was not a predictor of anxiety. Perceived control was a significant, but not independent, predictor of anxiety ($p < .01$).

Table 18: Regression Analysis for Predictors on Anxiety.

	Demog.	Chronic	Control	Support	Discrm1	Discrm2
Gender	.084	.084	.076	.083	.083	.087
Age	-.002	-.002	-.003	-.003	-.003	-.003
Education	-.049	-.048	-.017	-.018	-.018	-.020
Employed	-.018	-.018	-.014	-.015	-.015	-.015
Income	-.016	-.015	-.004	-.004	-.004	-.002
Any kids	-.022	-.022	-.046	-.036	-.036	-.037
Insurance	-.112	-.112	-.093	-.094	-.094	-.091
Race	-.011	-.011	.008	.011	.011	-.030
Chronic ill		.026	-.007	-.013	-.013	-.007
Perceived			-.093**	-.100**	-.100**	-.092
Control				-.071	-.071	-.078
Social Support					.000	.000
Med						.077*
Discrimination						
Gen						.810
Discrimination						.04
	.331	.316	.736	.910	.909	.813
Constant	.01	.01	.02	.03	.03	
$R^2 =$	2674	2674	2667	1945	1867	
N						

* $p < .05$, ** $p < .01$ (Unstandardized, beta coefficients reported)

However the addition of perceived discrimination eliminated the effect of perceived control. In the final model, only discrimination was significantly associated with anxiety ($p < .05$). Respondents reporting higher interference due to discrimination reported more anxiety than those with none due to discrimination. The final model explained little total variation in anxiety scores ($R^2 = 4\%$).

The lack of an association may have more to do with specificity of measurement. Anxiety measurement may be less specific than depression and if the chronic group consists of illnesses that are more acute than long lasting, any effect would be hidden. This is explored in a later section that differentiates the chronic illness group as only those conditions that are clearly persistent and long term compared to the healthy group.

Health Behavior Outcome Analysis

Table 19 presents the regression of predictors on alternative therapy use.

Table 19: Regression Analysis for Predictors on Alternative Therapy Use.

	Demog.	Chronic	Control	Support	Discrm1	Discrm2
Gender	.349*	.340*	.344*	.353*	.358*	.362*
Age	-.001	-.004	-.003	-.003	-.003	-.003
Education	.488**	.504**	.490**	.489**	.482**	.479**
Employed	.006	.007	.006	.005	.006	.007
Income	.069	.078	.073	.074	.077	.080
Any kids	-.105	-.103	-.092	-.081	-.088	-.089
Insurance	.073	.083	.074	.072	.072	.075
Race	-.080	-.078	-.086	-.083	-.098	-.144
Chronic ill		.440**	.455**	.447**	.440**	.446**
Perceived			.042	.034	.031	.040
Control				-.089	-.086	-.095
Social Support					.019	.019
Med						.086
Discrimination						
Gen						-.362
Discrimination						.05
Constant	-.032	-.297	-.489	-.271	-.250	.813
$R^2 =$	.2674	.2674	.2667	.1945	.1867	
N						

* $p < .05$, ** $p < .01$ (Unstandardized, beta coefficients reported)

Gender was a significant, independent predictor of alternative therapy use ($p < .05$). Females were significantly more likely to report use of CAM and to report using more types of CAM than males. This remained a significant effect throughout the model. Education was also a significant, independent predictor of CAM use (Table 19). Those with higher education were more likely to use CAM (Figure 6). The effect remained strong and consistent throughout the inclusion of additional variables ($p < .01$).

TABLE 20: Alternative Therapy Rates of Use for Illness and Discrimination Status.

Group	% use CAM	N
Chronic illness	55.2	2095
No illness	39.1	839
Females	57.2	1370
Males	44.9	1564
≤ HS education	43.3	1081
> HS education	54.9	1851
Discrimination	58.2	1286
No Discrimination	48.6	35

	Chronic illness	No illness
	55.2	39.1
Female	59.4	45.0
≤ HS education	53.0	35.3
> HS education	65.8	54.7
Male	48.2	31.8
≤ HS education	41.4	28.5
> HS education	55.0	35.0

* p<.01, **p<.001

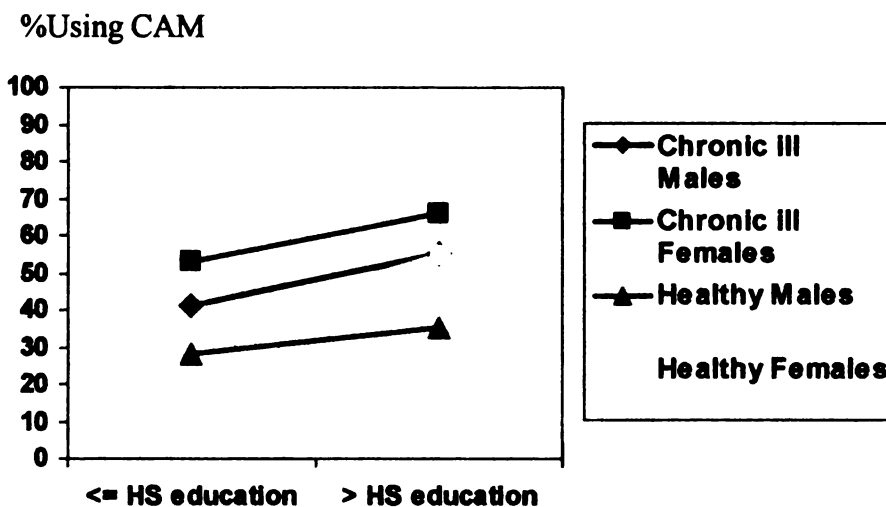


FIGURE 7: Alternative Therapy Use According to Illness Status and Demographics.

An interaction occurred between illness status, gender and education (Figure 7). Among the lower educated, use of CAM was ordered progressively from ill females, to ill males, to healthy females, and finally healthy males. However, among the higher educated, healthy females were not less likely to use CAM than ill males. Among the higher educated, the tendency for females to use CAM is so great that they are as likely to use alternative care as ill males.

Chronic illness was a significant, independent predictor of CAM. Those managing with a chronic illness were significantly more likely to use CAM ($p < .01$). The effect remained highly significant throughout the analysis modeling. *The primary hypothesis regarding CAM was supported by these findings.*

However, the addition of perceived control or social support did not alter the effect. There was a positive relationship between control and CAM. Respondents with higher control used more CAM but this was a non significant effect. There was a negative relationship between support and CAM. Respondents with little social support were more likely to use CAM but the relationship was not significant. There was a weak association between discrimination and use of alternative medicines that was non-significant in the regression model (Table 21 and Figure 7). This may be due to its interaction with chronic illness (Figure 7). There was no difference in CAM use among those not experiencing discrimination in life. However, among respondents reporting discrimination, those with illness were more likely to have used CAM than those who were healthy. The final model explained 5% of the total variation in CAM use frequency. *The secondary hypothesis regarding CAM and discrimination was supported by this model.*

% Using CAM

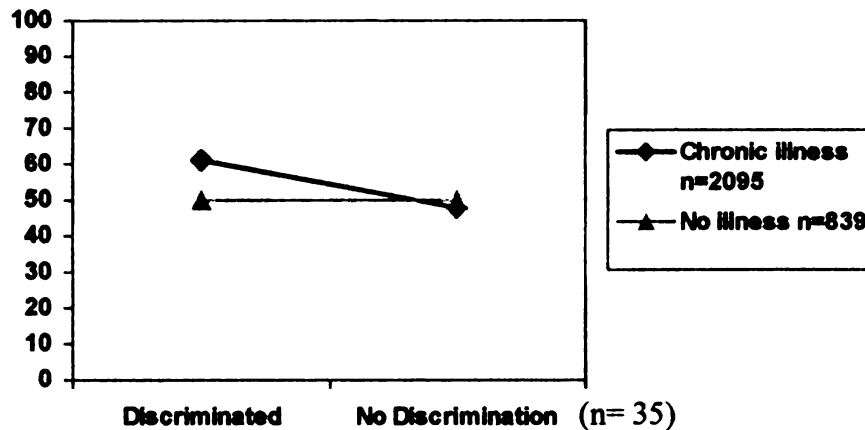


FIGURE 8: Alternative Therapy Use According to Illness Status and Discrimination.

Chronic Illness Subgroup Analysis

This regrouping eliminated 700 respondents from the chronic list who were shifted to the comparison group. The resulting subgroup of serious chronic illnesses included 1562 (53.2%) with one or more chronic illnesses and 1372 (46.8%) without (Total = 2934). The regression analyses for the subgroup of serious chronic illnesses did not alter the findings for depression outcome for all but the effect of chronic illness (Table 21). Results were nearly identical to the original analysis. Other cut-off points for grouping respondents according to listed conditions considered chronic or not resulted in similar findings.

Table 21: Regression Analysis of Outcomes According to Selected Serious Chronic Conditions.

Factor		Depression	Anxiety	CAM
Gender	(0=male)	.061	.083	.311*
Age	(years)	-.005*	-.002	-.004
Education	(0= ≤ HS)	-.022	-.047	.308**
Employed	(0=fulltime)	-.012	-.015	-.004
Income	(1= < \$10,000)	.012	-.007	.042
Any kids	(0=none home)	-.017	-.025	-.079
Insurance	(0=no ins)	-.155**	-.092	.013
Race	(0=white)	-.021	-.017	-.083
Chronic ill	(0=no illness)	.071	.057	.420**
Constant		3.16	.353	-.037
$R^2 =$		.03	.01	.04
n		2674	2674	2674

* $p < .05$, ** $p < .01$ (Unstandardized, beta coefficients reported)

Chronic illness as measured as Global physical health was a significant predictor for all three outcomes in this initial analysis (Table 22).

Table 22: Regression Analysis of Outcomes According to Global Physical Health.

Factor		Depression	Anxiety	CAM
Gender	(0=male)	.087*	.100	.363**
Age	(years)	-.005*	-.002	-.004
Education	(0= ≤ HS)	-.044	-.030	.520**
Employment	(0=fulltime)	-.019	-.020	.009
Income	(1= < \$10,000)	.015	-.009	.089
Any kids	(0=none home)	.021	-.001	-.064
Insurance	(0=no ins)	-.165**	-.109	.083
Race	(0=white)	-.016	-.010	-.103
Global health	(1=poor)	-.075**	-.068*	-.176**
Constant		3.23	.423	.400
$R^2 =$		.04	.02	.03
n		2934	2934	2934

* $p < .05$, ** $p < .01$ (Unstandardized, beta coefficients reported)

Poor perceived health was significantly associated with higher levels of depression, of anxiety, and of more frequent use of complementary alternative medicines (each $p < .001$). Depression was regressed on control variables and the independent factors in the six-block model and reanalyzed.

Table 23 presents results for depression. Gender was initially a significant but not independent predictor of depression. Its effect disappeared with the introduction of social support (Block 4). Females were more depressed than males until the quality of support available to them was controlled for. Females were then no more likely to be depressed if a supportive partner was available. Insurance remained throughout the six-model analysis a highly significant, independent predictor of depression. ($p < .01$). Respondents with insurance of any type were less depressed than those without insurance at the time of the survey. Perceived health was a significant predictor of depression. Respondents with better perceived physical health were less depressed than those with poor perceived health ($p < .01$).

The magnitude of the effect weakened somewhat with the introduction of control but remained a significant predictor of depression at $p < .05$). Control was a highly significant, independent predictor of depression ($p < .01$). Social support was also a highly significant, independent predictor of depression ($p < .01$). As the reported quality of support increased the likelihood of depression decreased.

Table 23: Regression Analysis for Depression on Predictors according to Global Physical Health.

Factor	Demog.	Chronic	Control	Support	Discrm1	Discrm2
Gender	.077	.087*	.081*	.068	.069	.071
Ages	-.001	-.001	-.001	-.003	-.003	-.003
Education	-.060	-.044	-.007	-.005	-.006	-.008
Employment	-.019	-.019	-.018	-.017	-.017	-.016
Income	.006	.015	.024	.022	.023	.024
Any kids	.014	.021	.005	-.011	-.012	-.013
Insurance	-.174**	-.165**	-.149**	-.148**	-.148**	-.146**
Race	-.012	-.016	.012	.009	.005	-.021
Global health		-.075**	-.048*	-.043*	-.043*	-.042*
Perceived Control			-.109**	-.098**	-.098**	-.094**
Social Support				.135**	.135**	.130**
Med Discrimination					.004	.004
Gen Discrimination						.049*
Constant	3.04	3.23	3.55	3.21	3.21	3.15
$R^2 =$	.02	.04	.08	.09	.09	.10
n	2934	2674	2667	1945	1867	813

* $p < .05$, ** $p < .01$ (Unstandardized, beta coefficients reported)

Discrimination specific to the receipt of medical services was not significant. However, discrimination reported to interfere with life was significantly associated with more depression ($p < .05$). The final model demonstrated that the lack of insurance, low control, and poor support are significant predictors of depression. In addition, poor physical health and the experience of discrimination are independent predictors of depression. *This analysis supported the primary hypothesis chronic illness increases the risk of depression.*

Anxiety was regressed on control variables and the independent factors in six blocks and reanalyzed. Table 24 presents results for generalized anxiety. None of the

control variables were associated with anxiety. Perceived health was initially a significant predictor of anxiety but was not independent of personal agency.

Table 24: Regression Analyses for Anxiety on Predictors according to Perceived Physical Health.

Factor	Demog.	Chronic	Control	Support	Discrm1	Discrm2
Gender	.090	.100	.095	.103	.102	.106
Age	-.001	-.001	-.002	-.001	-.003	-.003
Education	-.045	-.030	-.004	-.006	-.005	-.008
Employment	-.021	-.020	-.020	-.020	-.020	-.020
Income	-.017	-.009	-.002	-.001	-.001	.001
Any kids	-.007	-.001	-.013	-.004	-.004	-.005
Insurance	-.117	-.109	-.098	-.098	-.098	-.096
Race	-.007	-.010	.010	.012	.012	-.027
Global health		-.068*	-.048	-.050	-.050	-.048
Perceived Control			-.078**	-.084**	-.084**	-.078**
Social Support				.076	.076	.084
Med Discrimination					.000	.000
Gen Discrimination						.074*
Constant	.247	.423	.648	.842	.841	.747
$R^2 =$	.01	.02	.03	.03	.03	.04
n	2934	2674	2667	1945	1867	813

* $p < .05$, ** $p < .01$ (Unstandardized, beta coefficients reported)

The addition of perceived control eliminated the effect seen with the global measure of health. Perceived control remained throughout the analysis a significant, independent predictor of generalized anxiety ($p < .01$). Discrimination reported to interfere with life was an independent, significant predictor of anxiety ($p < .05$). Anxiety was more common in respondents who reported greater interference in life due to discrimination

Use of complementary alternative medicine was regressed on control variables and the independent factors in six blocks and reanalyzed. Table 25 presents results for CAM.

Table 25: Regression Analyses for CAM on Predictors according to Global Physical Health.

Factor	Demog.	Chronic	Control	Support	Discrm1	Discrm2
Gender	.339*	.363**	.367**	.382**	.387**	.390**
Age	-.002	-.002	-.001	-.001	-.001	-.002
Education	.481**	.520**	.500**	.497**	.490**	.487**
Employment	.008	.009	.008	.007	.009	.009
Income	.068	.089	.084	.086	.090	.092
Any kids	-.079	-.064	-.055	-.037	-.044	-.045
Insurance	.062	.083	.074	.073	.072	.074
Race	-.096	-.103	-.119	-.114	-.131	-.166
Global health		-.176**	-.191**	-.196**	-.196**	-.193**
Perceived Control			.060	.046	.044	.050
Social Support				.153	.149	.156
Med Discrimination					.021	.022
Gen Discrimination						.066
Constant	-.054	.400	.223	.616	.627	.543
$R^2 =$	.02	.03	.03	.03	.04	.04
n	2934	2674	2667	1945	1867	813

* $p < .05$, ** $p < .01$ (Unstandardized, beta coefficients reported)

Gender was a significant, independent predictor of CAM use. Females were more likely to report use of CAM than males ($p < .05$). This effect was enhanced further with the addition of perceived physical health. Perceived health was a significant, independent predictor of CAM ($p < .01$). Respondents with poorer health were more likely to use CAM. Education was also a significant, independent predictor of CAM use ($p < .01$). Higher education was associated with greater use of CAM. An interaction occurred between illness status, gender and education (Figure 6). Among the lower educated, use of CAM was ordered progressively from ill females, to ill males, to healthy

females, and finally healthy males. However, among the higher educated, healthy females were not less likely to use CAM than ill males. Among the higher educated, the tendency for females to use CAM is so great that they are as or more likely to use it than are ill males. Discrimination was not associated with utilization of CAM. The final model demonstrated that higher educated females with poorer physical health were the most likely to utilize CAM ($p < .01$).

Table 26: Zero Order Correlations for Mental Health Outcome.

Dependent Variable:	Depression	Chronic Illness
<u>Independent Variables</u>	<u>r-Coefficient</u>	<u>r-Coefficient</u>
Gender	.056	.027
Age	-.104**	-.092**
Race	.001	-.021
Education	-.054	.196**
Employment	-.045	-.074*
Income	-.005	.166**
Insurance	-.104**	.090**
Children home	.029	.049
Chronic Illness	-.133**	1.00
Control	-.237**	.255**
Support	-.181**	.081*
Discrimination1	.014	.007
Discrimination2	.109**	-.094**

* $p < .05$, ** $p < .01$

In the zero-order correlation analysis for depression, age, insurance, illness, control, support, and perceived discrimination were significantly associated with depression (Table 26 & Table 28). Younger age, less insurance, chronic illness, low control, less support, and more discrimination were significantly associated with higher

depression scores. In the zero-order correlation analysis for chronic illness, older age, less education, employment, lower income, less insurance, lower control, less support, and more discrimination were significantly associated with having a chronic illness. The similar patterns in these correlations indicate that depression itself can manifest as a chronic insult on health that is very much associated with physical chronic illness. Because chronic illness is so highly correlated with lower socio-economic status, its small contribution to the prediction of depression may be accounted for by its correlation with the previous predictors and the correlation between depression and chronic illness.

Table 27: Zero Order Correlations for Complimentary Alternative Medicine Use.

Dependent Variable:	CAM Use	Chronic Illness
<u>Independent Variables</u>	<u>Correlation Coefficient</u>	<u>Correlation Coefficient</u>
Gender	.075*	.027
Age	-.013	-.092**
Race	-.031	-.021
Education	.158**	.196 **
Employment	-.005	-.074*
Income	.038	.166**
Insurance	.038	.090**
Children home	-.023	.049
Chronic Illness	-.047	1.00
Control	.034	.255**
Support	.034	.081**
Discrimination1	.041	.007
Discrimination2	.007	-.094**

* $p < .05$, ** $p < .01$

In the zero-order correlation analysis for CAM, gender and education were significantly associated with CAM use (Table 27). Chronic illness approached, but did not reach, a significant association ($p = .08$). Females, who are highly educated, were most

likely to use CAM. However, highly educated females are also more likely to be in better health, have higher perceived control, and greater support. The zero-order correlation analysis for chronic illness demonstrated significant correlations with older age, less education, unemployment, less income, less insurance, lower control, less support and more discrimination. Although the correlation between gender and education is highly significant for CAM use, chronic illness remained a significant predictor in the multiple regression, thus indicating it as a significant predictor of CAM use.

The interaction term $\text{Discr1} * \text{illness}$ was not statistically significant for depression ($p=.92$). The interaction term for $\text{Discr2} * \text{illness}$ was not statistically significant for depression ($p=.16$). The negative direction of the association between the interaction terms and depression suggests that the effect of illness on depression is lower for those who experience more discrimination. Although this was not significant statistically, the amount of explained variation increased from 0.11 to 0.14 with the final interaction term included (Table 31). No significant effect was observed for the model on anxiety (Table 32). The interaction terms were not statistically significant ($p > .90$ for both $\text{Discr1} * \text{illness}$ and $\text{Discr2} * \text{illness}$). The final amount of variation explained remained at .04.

There was no statistically significant effect of the interaction term on the predictor of alternative medicine use ($p > .90$ for both $\text{Discr1} * \text{illness}$ and $\text{Discr2} * \text{illness}$). The amount of variation explained by the model increased slightly from .04 to .046 (Table 25).

CHAPTER FOUR

DISCUSSION

The present study examined the relationship between chronic illness and alternative medicine utilization and psychological distress. Two primary hypotheses based on six possible models for the relationships with key independent variables were examined within the domains of illness and discrimination. Findings indicated that the presence of chronic illness is associated with mental distress and depression. The effect of illness on mental health is not independent of personal agency and social support. Furthermore, the experience of discrimination perceived to interfere with life is associated with greater depression rates, particularly among those managing a chronic illness use and provides support of a moderating affect of discrimination on mental wellbeing. In addition, the current analysis demonstrated a highly significant main effect of chronic illness for complementary alternative medicine (CAM).

Hypothesis #1: There is a significant positive relationship between mental distress/depression and the presence of a chronic illness. Findings from the current analysis support this hypothesis. Chronic illness was an independent predictor of depression and anxiety even in the presence of control variables for age and insurance. Respondents with a chronic illness had higher rates of depression than those reporting no illness regardless of age or insurance status. The presence of a chronic illness imposes chronic stressors unique to the daily stresses of other role strains. An illness that is ongoing requires adjustment to a different lifestyle and to new health-related behaviors. There are stressors involved with the illness, as well as strains related to the new lifestyle

(Brown and Harris 1978). In addition, the pressure from having to conform to different rules and regulations given a desire to comply with improved outcomes is difficult. As demonstrated by Pearlin, et al., these demands cause initial and proliferated stress that can lead to mental strain (1997). Such chronic stressors have been shown to uniquely impact negatively on mental health when measured separately from the effect of daily hassles (Serido, et al 2004). Serido et al., provided support for chronic home stressors functioning as a moderating factor on the relationship between daily hassles and psychological distress (2004). They also utilized the MIDUS study and demonstrated that chronic stressors themselves increase psychological distress and depression. Because chronic illness is a chronic stress as conceptualized by Wheaton (1984), their findings support the current analysis that chronic illness increases mental distress and/or depression.

Interestingly, it was the respondents 50 years of age or younger who had significantly higher rates of depression independent of health insurance coverage. The protective effect of age held for those with chronic illness and for those who were healthy. The worst off by far were younger respondents (≤ 50 years of age) who were managing a chronic illness with no health insurance coverage. Their rates of depression were over 14% (Figure 4). Other current evidence in the psychological literature has challenged the previous assumption that older people are more depressed due to their age (Gottlieb SS, et al. 2004; Schieman S, et al. 2002).

The effect of chronic illness on depression rates was strongly mediated by self efficacy, as measured in this analysis by perceived control, and was moderated by social support. As previous research has established and the current analysis supports, low

perceived control was associated with higher depression rates even among healthy respondents. Rapley and Fruin (1999) summarized the juxtaposition of general and regimen-specific self efficacy in chronic illness. For those with a chronic illness, changes in lifestyle are not only difficult but are necessary. These major changes may involve role adjustments, learning new behaviors, and modifying one's lifestyle. The ease with which changes occur depends on the person's self efficacy beliefs and outcome expectations. People carryout multiple regimen- and task-specific behavior in order to manage the chronic illness. The ability to comply with the new regimen and tasks is directly dependent on self efficacy. A belief in oneself to tackle new barriers and accomplish new goals mediates the strain that an illness presents to ones psyche. The greater the self efficacy, the more likely one will perform behaviors consistent with therapeutic compliance and the more likely they will achieve positive outcomes, either in managing the illness or preventing future comorbidities. The current analysis demonstrated that depression outcomes related to chronic illness are highly mediated but not eliminated by self efficacy. Chronically ill respondents, even those high in self efficacy, still had higher depression rates than the 4% seen in the general population (Table 16).

An interaction in illness-related depression rates occurred between social support and perceived control in the current analysis. Social support did not impact depression rates for the chronically ill group with low control (Figure 4). However, for those reporting high perceived control who were managing a chronic illness, a depression rate of 12% dropped to less than 4% in the presence of support. This suggests an interaction between support and self efficacy and illness. The ease with which lifestyle adjustments occur depends on the person's efficacy but also on their outcome expectations (Rapley

and Fruin 1999). Ill respondents with low self efficacy may be unable to harness the benefit that is available from a highly supportive spouse due to low expectations of the outcome whereas those with high self efficacy have the confidence to draw upon the resources provided by a supportive partner.

The group with the highest depression rates were those with a chronic illness who reported a non-supportive partner and this effect held for both those with low perceived control (11% depressed) and with high perceived control (12% depressed).

The secondary hypothesis #1: The relationship between mental distress/depression to the presence of chronic illness is significantly magnified by the experience of discrimination in general and by discrimination in receipt of medical services specifically. Findings support this hypothesis overall. Depression rates were significantly higher for those reporting that the experience of discrimination interfered in their life. Those in whom discrimination was perceived to interfere had higher rates of depression (7%) than those in whom discrimination did not interfere (4%). The true size of the effect of discrimination regarding illness was difficult to conclude because the group experiencing no discrimination who were also healthy was extremely small, only 10 respondents. However, depression rates were higher for the chronically ill regardless of discrimination status and furthermore, among those with a chronic illness the presence of discrimination increased depression rates (8% versus 10%) (Figure 5).

The final model demonstrated a non-significant effect of chronic illness on mental health mediated by perceived control and social support that is clearly magnified by the experience of discrimination in life.

The findings of the final regression model for the outcome of mental wellbeing indicated no statistically significant effect for an interaction of discrimination and chronic illness on depression. Although the stress process theory supports a role for the interaction of discrimination and chronic illness through increased encounters with the healthcare system and increased opportunities for discrimination, the current analysis shows no clear evidence of this. No effect modification was observed with the interactions of discrimination and chronic illness for anxiety. It is possible that it takes a significant amount of discrimination, even for those dealing with a chronic illness, to be pushed to the limit regarding stress from such discrimination and thus it would not show up as mental strain until it reached a severe intensity.

Primary hypothesis #2: There is a significant positive relationship between chronic illness and the utilization of complementary alternative medicine (CAM). This hypothesis was also supported by the analytic findings. Chronic illness was a significant predictor of CAM use. Respondents who were managing with a chronic illness were significantly more likely to report alternative methods of care. This effect was independent of, but not entirely unrelated to, two other factors that were associated with CAM use. Gender and educational attainment were also significant predictors of CAM.

The willingness to try an alternative means for obtaining healthcare was distinctly a female tendency. The gender effect was independent of education. Women are more likely than men to report CAM use. Even in health, women were more likely than men to use CAM. This effect supports what we know for health behaviors and medical care in general. Women are significantly more likely to utilize primary care services (Bertakis KD, et al. 2000), to make outpatient visits more often (Bertakis KD, et

(Bertakis KD, et al. 2000; Burns MJ, et al. 2001), and to be prescribed multiple classes of medications (Roe CM, et al. 2002) than men, who tend to avoid or forestall healthcare issues.

The use of CAM was strongly influenced by educational attainment. Respondents with some college or a college degree were much more likely to utilize CAM than those with a high school degree or less. This is supported by research on CAM conducted in many other populations. Among veterans (Smola S, et al. 2001), among the elderly (Muhajarine N, et al. 2000), and among patients hospitalized for surgery (Cherniack EP, et al. 2001) the higher educated are more likely to use alternative methods of care. This may be due to a greater knowledge of alternatives that are available, a larger social network that provides opportunities to alternatives, or due to more resources attained by the highly educated. All three of these factors may be operating for the higher educated. However, these factors do not explain the gender effect of CAM use. Women in society do not necessarily have more resources, a higher education, and greater knowledge of health than men. In the current analysis, even healthy females with low educational attainment were more likely to use CAM than males (Figure 6).

The three significant predictors (gender, education, illness) were not entirely independent of each other in their effect on CAM. Women, in general, are more likely to suffer chronic illness and consequently there would be more women seeking care. Although women in general have higher rates of chronic illness, the gender effect on CAM use was independent of illness status in the current analysis. Since women in general are more likely to interact with the health care profession it is not surprising that they are more likely to seek and use CAM.

The effect of illness on CAM use was modified by education. Among the lower educated group, ill males were more likely to use CAM. Yet, among the higher educated, healthy females were just as likely to use CAM as ill males. Illness was a stronger predictor of CAM use than gender among those with lower education. This interaction may be highlighting the relationship of resources in health seeking behavior. For those with few resources, illness necessitates seeking and use alternatives even among males who prefer to avoid encounters with the health care system. Those who have higher education also have access to more resources and more importantly access to extra resources for prevention. The gender effect is magnified in this group because females are the most likely to visit a health care professional and with resources, are more likely to seek out healthcare services to prevent illness. There was no interaction between discrimination and CAM use (Table 33). The results do show that discrimination in medical services does increase depression, anxiety and CAM –even though there is no interaction effect. The primary hypotheses and secondary hypotheses #2 and #4 were significant and consistent. However, hypotheses #1 and #3 were not supported for an interaction.

Limitations

Some subgroups suffered from small sample sizes, although the overall sample of 4000 respondents was large. A greater concern is the small amount of variation in each dependent variable that the models were able to explain. The low values for the coefficients of variation in each model (10% and 4%) are an indication of much measurement error or random variation or both. Measurement error likely played a role in the analysis that measured chronic illness by inventory. The model's ability to explain

the variation in depression more than doubled when chronic illness was measured using global perceived health. However, even though it was strengthened, the final model explained only 10% of the variation in depression rates. This may indicate more random variation and thus make it less likely that the findings would be duplicated. Although low, coefficients of variation are often disappointingly small in epidemiologic studies (Friedman GD 2004). The consistent statistical significance of the regression coefficients for the tested predictive factors makes a chance finding less likely.

The error rate was high regarding CAM use and this threatens the validity of the findings that chronic illness is a predictor of CAM. However, chronic illness was clearly a statistically significant predictor of CAM use even in the presence of error. In addition, whether measured by inventory or perceived health, it significantly predicted alternative medicine use. This may indicate that the analysis suffered less from measurement error than from random error as evidenced by the large and statistically significant regression coefficients. Therefore, the finding that chronic illness can be a significant predictor of CAM use is important.

This analysis does have limited generalizability because those not responding to the mailed survey were significantly different than survey respondents on several demographic characteristics. These results may not apply to younger, single males without a high school degree. Previous research has shown that respondents who complete surveys differ on reported physical and mental health with higher scores for each (Powers JR, et al. 2003). Among those included in the analysis, generalizability may be limited regarding minority status. Only 13% of the 2934 respondents were a minority and the impact of chronic illness on mental health may be under estimated for

them. Future analyses will need to be conducted on much larger nationally representative samples in order to validate these findings.

Conclusions

Previous studies have established that chronic stress and its related stressors impacts negatively on mental health (Brown & Harris 1978, Wheaton 1994). Furthermore, chronic stress occurs not in isolation but in relation to a 'web of interconnectedness' among multiple factors both acute and chronic (Pearlin 1999). The broader social context of work and family environment and the roles established for individuals can effect whether an illness precipitates or exacerbates mental wellbeing (Wheaton 1994, Peralin 1999). For illness, not only do stressors occur within a complex process, but any particular stressor within the web can lead sequentially to other stressors. The presence of illness can lead to the emergence and the proliferation of other chronic stressors (Peralin 1989) and the buildup of stressors manifests as anxiety and depression.

As important as the broader social context is in coping with an illness, other situational factors contribute to the context within which one experiences stressors (Wheaton 1996, Seredo et. al., 2004). Most recently, research on stress and psychological health has demonstrated that chronic stressors may have a unique effect on distress (Seredo et. al., 2004). The current analysis supports this thesis that chronic stressors present an ongoing threat to the individual, the ever-present potential to erupt in various ways that impact on daily life. Chronic illness is a primary chronic stress that not only can lead to poor mental health but causes the emergence of other stressors as chronic, such as discrimination when seeking ongoing health care. This study demonstrated that chronic illness increases the likelihood of depression even when

controlling for other characteristics such as age, gender, and insurance. However, as expected, the presence of personal agency and positive support mediated its effect. The weak effect of chronic illness on depression may be due in large part to the impact of secondary and proliferating stressors introduced by the ongoing illness that were not accurately reflected by the survey's measures. The use of a global measure of physical health increased the association but it remained somewhat weak because of other factors that may have had greater precision in their measurement. The presence of illness was no longer significant when perceived control and social support were included and these variables may have had greater accuracy in their measurement because of previously validated instruments that were used in MIDUS.

While there are associations between chronic stressors and daily hassles, they may each have a unique effect on psychological distress at the aggregate and daily levels. Seredo, et. al., suggest that daily hassles, as a vast array of minor disruptions, can force the individual to act acutely and thereby increase psychological distress distinct from the chronic stress (2004). The current study supports their findings. Discrimination was a distinct predictor of depression and anxiety independent of the effect from chronic illness. Our study was unable to show whether this was indeed due to discrimination specific to the receipt of health care services because of the small numbers involved. However, it did demonstrate that perceived discrimination in general can lead to increased levels of depression, especially for those with a chronic illness.

Health seeking behavior can also have an impact on mental wellbeing and can account for some disparities in mental health outcomes. Health behaviors occur in the broader social context within which the chronic stressor of illness emerges and access is a

key initiator to seeking care. Previous research has demonstrated that women seek health care more often than men and individuals with unmet healthcare needs are more likely to seek and use CAM (Sturm and Sherbourne 2001). This may explain the current findings that education modified the gender effect of illness on CAM use. Lower education results in fewer resources and greater unmet need for health care. Under these circumstances, an illness may more likely prompt even males to seek alternative care. Healthcare seeking behavior may also be impacted by the experience of discrimination. Discrimination interacted with illness in the current analysis suggesting greater unmet need for healthcare services among those with a chronic illness.

Even though the current study lacked power in some analyses and may have suffered from low specificity in some measures, suggested trends add to what is already known in the mental health research. Chronic illness is a chronic stressor that can increase depression. The regression analysis suggests a causal relationship because the addition of illness was significant even after controlling for known factors that increase the risk of depression and when measured by global health, the effect remained significant after adding all other independent variables. Furthermore, the experience of discrimination adds to the distress as either a unique chronic stressor or a factor increasing daily hassles. Chronic illness is also an independent predictor of healthcare seeking behavior and may reflect the greater unmet healthcare need among those experiencing ongoing, long-term stresses.

Given these findings, an accurate measure of chronic illness that validly reflects the chronic nature of living with a chronic illness needs to be developed and tested. Future research may then be able to isolate, not only the effect of chronic illness on

mental health outcomes but discern the effects according to the proliferation of secondary stressors on depression and anxiety. Such a measure would also assist future research in identifying the effect of discrimination from ongoing encounters with the healthcare system regarding the management of chronic illness.

APPENDIX A

LIST OF VARIABLES

TABLE 28: List Of Variables

Demographics:	
Number of respondents	#
Households with children under 18 years of age	#
Gender	M/F
Age	Years
Race:	Caucasian Minority: Black / African American Native American /Eskimo Asian or Pacific Islander Multiracial Other
Marital status:	Married Not married: Separated Divorced Widowed Never married
Partnership:	Currently living with someone in a steady, marriage like relationship: Y/ N
Children have:	Number
Education:	Up to High School High School Graduate Beyond High School: 1 – 2 yrs college 3 or more college 4 yr degree Master degree Advanced degree
Employment:	Working now/self-employed Not working: Looking for work unemployed Laid off /leave temporary Retired Homemaker Disabled permanently

Respondent Income: (also Spouse / other adult income)	Annual: \$00 - \$9,999 \$10,000-\$19,999 \$20,000-29,999 \$30,000-39,999 \$40,000-49,999 \$50,000-\$74,999 \$75,000-\$99,999 \$100,000 and above
Perceived financial status: Would you say you have more money, just enough, or not enough to meet your family's needs?	1. More money than need 2. Just enough money 3. Not enough money
Perceived financial status: How difficult is it for you and your family to pay your monthly bills?	1. Very difficult 2. Somewhat difficult 3. Not very difficult 4. Not at all difficult
Health Insurance:	Private insurance w/ insurer Private insurance w/ employer Medicare Medicaid Champus / other government insurance
Perceived physical health: (also perceived mental health)	1. Poor 2. Fair 3. Good 4. Very Good 5. Excellent
Do you smoke cigarettes regularly now?	Yes / No
Usual Care: Do you have one particular place where you usually get medical care?	Yes / No
Usual Care: Do you have one particular doctor who you usually see?	Yes / No
Alternative Therapy Utilization: Have you used any in the past 12 months to treat, prevent, illness or to maintain health?	Acupuncture Biofeedback Chiropractic Energy healing Exercise therapy Herbal therapy High dose mega vitamins Homeopathy Hypnosis Imagery techniques Message therapy Prayer or spiritual practice Meditation techniques

	Special diets Other_____
Scales and Indexes	
<p>Depression Index: Ever a time in last 12 months felt sad, blue, or depressed for two weeks or more in a row?</p> <p>In past 12 months do you worry more, less, or same as most people?</p> <p>During past 30 days how much did you feel: so sad nothing could cheer you up? Hopeless? That everything is an effort?</p> <p>During past 30 days how much did you feel: Cheerful? In good spirits? Extremely happy? Calm and peaceful? Satisfied? Full of life?</p>	<p>Yes / No / On medication</p> <p>More / Less / About same</p> <p>All the time Most of the time Some of the time Little of the time None of the time</p> <p>All the time Most of the time Some of the time Little of the time None of the time</p>
<p>Perceived Control Index:</p> <p>Level of agreement with:</p> <p>The demands of everyday life often get me down.</p> <p>In many ways I feel disappointed about my achievements in life.</p> <p>Maintaining close relationships has been difficult and frustrating for me.</p> <p>I live life one day at a time and don't really think about the future.</p> <p>I sometimes feel as if I've done all there is to do in life.</p> <p>I gave up trying to make big changes in my life.</p> <p>There is little I can do to change the important things in my life.</p> <p>I often feel helpless in dealing with the problems of life.</p> <p>Other people determine most of what I can and cannot do.</p> <p>What happens in my life is often beyond my control.</p>	<p>Strongly Agree Somewhat Agree Agree a Little Don't know Disagree a Little Somewhat Disagree Strongly Disagree</p>

<p>There are many things that interfere with what I want to do. I have little control over the things that happen to me. There is really no way I can solve the problems I have. I sometimes feel I am being pushed around in life.</p>	
<p>Daily Stress/Hassles Index:</p> <p>How often experienced each of the following in the past year:</p> <p>You have too many demands made on you. You have a lot of interruptions at home.</p> <p>Responsibilities at home reduce the effort can devote to job. Personal or family worries distract you when at work. Activities at home prevent you from getting the sleep you need to do your job. Stress at home makes you irritable at work.</p>	<p>All the time Most of the time Some times Rarely Never</p>
<p>Quality of Support Index:</p> <p>Would you describe your relationship as:</p> <p>How much does your partner care about you? How much does he/she understand the way you feel? How much does he/she appreciate you? How much can you rely on him/her for help with a serious problem?</p>	<p>Excellent Very good Good Fair Poor</p> <p>A lot Some A little Not at all</p>
<p>Discrimination Index: (due to race, gender, age, disability, other)</p> <p>To what extent does discrimination interfere with your life?</p>	<p>A lot Some A little Rarely Not at all</p>

<p>How many times in life have you been discriminated against by being denied or provided inferior medical care?</p>	<p>Number</p>
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APPENDIX B

SCALES AND INDEX MEASURES

Depression Index

1. During the past 12 months was there ever a time when you felt sad, blue, or depressed for two weeks or more in a row? Yes / No

2. People differ a lot in how much they worry. Considering how things have been going in your life over the past 12 months, do you worry:

More, Less, About the same, or Not at all

3. During the past 30 days, how much of the time did you feel so sad that nothing could cheer you up?

All the time, most, some, a little, or None of the time

4. During the past 30 days, how much of the time did you feel hopeless?

All the time, most, some, a little, or None of the time

5. During the past 30 days, how much of the time did you feel that everything was an effort?

All the time, most, some, a little, or None of the time

6. During the past 30 days, how much of the time did you feel satisfied?

All the time, most, some, a little, or None of the time

7. During the past 30 days, how much of the time did you feel in good spirits?

All the time, most, some, a little, or None of the time

8. During the past 30 days, how much of the time did you feel extremely happy?

All the time, most, some, a little, or None of the time

9. During the past 30 days, how much of the time did you feel calm and peaceful?

All the time, most, some, a little, or None of the time

10. During the past 30 days, how much of the time did you feel satisfied?

All the time, most, some, a little, or None of the time

11. During the past 30 days, how much of the time did you feel full of life?

All the time, most, some, a little, or None of the time

Perceived Control Index

All item responses on a 7-item Likert Scale:

Agree Strongly / Somewhat / A Little / DK / A Little / Somewhat / Disagree Strongly

1. The demands of everyday life often get me down.
2. In many ways I feel disappointed about my achievements in life.
3. Maintaining close relationships has been difficult and frustrating for me.
4. I live life one day at a time and don't really think about the future.
5. I sometimes feel as if I've done all there is to do in life.
6. I gave up trying to make big improvements or changes in my life a long time ago.
7. There is little I can do to change the important things in my life.
8. I often feel helpless in dealing with the problems of life.
9. Other people determine most of what I can and cannot do.
10. What happens in my life is often beyond my control.
11. There are many things that interfere with what I want to do.
12. I have little control over the things that happen to me.
13. There is really no way I can solve the problems I have.
14. I sometimes feel I am being pushed around in my life.

Alternative Therapies

Each item response was dichotomous (Yes or No) as to ever using it.

1. Have you ever used the following items to treat a physical health problem, to treat an emotional or personal problem, to maintain or enhance your wellness, or to prevent the onset of illness?

- a. Acupuncture
- b. Biofeedback
- c. Chiropractic
- d. Energy healing
- e. Exercise or
- f. Herbal therapy
- g. High doses of vitamins
- h. Homeopathy
- i. Hypnosis
- j. Imagery techniques
- k. Message therapy
- l. Prayer or other spiritual practice
- m. Relaxation or meditation techniques
- n. Special diets
- o. Spiritual healing by others
- p. Any other non-traditional remedy

2. Did you ever use the following items on your own without a prescription or in doses beyond what was prescribed?

- a. Sedatives, either barbiturates or sleeping pills
- b. Tranquillizers or nerve pills
- c. Amphetamines or other stimulants

APPENDIX C

Correlation Matrix Tables

Table 29: Pearson's Correlation Matrix for Depression.

	DEP	Gender	Age	Race	Edu.	Emp.	Incom.	Ins.	Kids	Illness	Contro l	Support	Diser2
DEP	1.0	.06	-.10**	.00	-.05	-.05	-.01	-.10**	.03	-.13**	-.24**	-.18**	.11**
Gender	.06	1.0	-.14**	-.04	-.04	.20**	-.33**	.01	.03	.03	-.01*	-.10**	
Age	-.10**	-.14**	1.0	-.09**	-.03	.25**	-.03	.05	-.41**	-.09**	-.10**		
Race	.001	-.04	-.09**	1.0	-.08*	-.07*	-.04	-.05	.04	-.02			
Educa.	-.05	-.04	-.03	-.01*	1.0	-.05	.28**	.21**	-.04				
Emp.	-.05	.19**	.25**	-.01*	-.05	1.0	-.50**	-.15**					
Income	-.01	-.33**	-.03	-.04	.3**	-.50**	1.0						
Ins.	-.10**	.01	.05	-.05	.2**	-.15**							
Kids	.03	.03	-.41**	.04	-.04								
Illness	-.13**	.03	-.00**	-.02									
Control	-.24**	-.07*	-.10*										
Support	-.18**	-.10**											
Diser1	.01												
Diser2													

*p<.05, **p<.01

Table 30: Pearson's Correlation Matrix for Complementary Alternative Medicine Use.

	CAM	Gender	Age	Race	Edu.	Emp.	Incom.	Ins.	Kids	Illness	Contrl	Support	Discr2
CAM	1.0	.08*	-.01	-.03	.16**	-.01	.038	.038	-.023	-.047	.034	.034	.01
Gender	.08*	1.0	-.14*	-.04	-.04	.20**	-.33**	.011	.029	.027	-.07*	-.10**	
Age	-.01	-.14	1.0	-.08*	-.03	.25**	-.03	.051	-.41**	-.09**	-.10**		
Race	-.03	-.04	-.09	1.0	-.08*	-.07*	-.038	-.047	.044	-.02			
Educa.	.16**	-.04	-.03*	-.08*	1.0	-.05	.28**	.21**	-.035				
Emp.	-.01	.19**	.25	-.07*	-.05	1.0	-.50**	-.15**					
Income	.038	-.33**	-.03	-.04	.3**	-.5**	1.0						
Ins.	.038	.01	.05	-.05	.2**	-.2**							
Kids	-.023	.03	-.41**	.04	-.04								
Illness	-.047	.03	-.09**	-.02									
Control	.034	-.07*	-.10**										
Support	.034	-.10**											
Discr1	.04												
Discr2													

*p<.05, **p<.01

Table 31: Regression Analysis of Predictors on Depression.

	Demog.	Chronic	Control	Support	Discr1	Discr2	Discr1* illness	Discr2 illness
Gender	0.064	0.062	0.051	0.036	0.037	0.040	0.04	.038
Age	-.004*	-.005*	-.006**	-.006**	-.006**	-.006**	-.006**	-.006**
Education	-.067	-.063	-.022	-.020	-.021	-.023	-.021	-.021
Employment	-.012	-.012	-.007	-.005	-.005	-.005	-.005	-.005
Income	0.011	0.012	0.027	0.026	0.027	0.028	0.027	0.027
Kids	-.019	-.019	-.050	-.069	-.070	-.071	-.071	-.070
Insurance	-.158**	-.157**	-.139**	-.137*	-.133*	-.131*	-.131*	-.132*
Race	-.020	-.020	0.006	0.001	-.002	-.030	-.030	-.040
Chronic ill		0.091*	0.047	0.059	0.057	0.061	0.061	0.060
Control			-.124**	-.110**	-.110**	-.105**	-.105**	-.0106**
Support				-.144**	-.145**	-.140**	-.140**	-.141**
Discr 1					0.004	0.004	0.004	0.004
Discr 2						0.052*	0.052*	0.052*
Discr1*illness							-1.181E-05	-1.748E-05
Discr2*illness								-.019
Constant	3.23	3.17	3.7	3.4	3.4	3.3	3.3	3.4
R ²	0.02	0.05	0.07	0.08	0.10	0.11	0.11	0.14
N	2674	2674	2667	1945	1867	813	813	800

*p<.05, **p<.01 (Unstandardized, beta coefficients reported)

+Discr1 is discrimination in receipt of medical services

#Discr2 is perceived discrimination

Table 32: Regression Analysis for Predictors on Anxiety.

	Demog.	Chronic	Control	Support	Discr1	Discr2	Discr1* illness	Discr2 illness
Gender	0.090	0.100	0.095	0.103	0.102	0.106	0.106	0.105
Age	-.001	-.001	-.002	-.001	-.003	-.003**	-.002**	-.003**
Education	-.045	-.030	-.004	-.006	-.005	-.008	-.008	-.007
Employmt	-.021	-.020	-.020	-.020	-.020	-.020	-.021	-.020
Income	-.017	-.009	0.002	-.001	0.001	0.001	0.001	0.001
Kids	-.007	-.001	-.013	-.004	-.004	-.005	-.005	-.005
Insurance	-.117	-.109	-.098	-.098	-.098	-.096	-.096	-.096
Race	-.007	-.010	0.010	0.012	0.012	-.027	-.028	-.028
Chronic ill		-.068*	-.048	0.050	-.050	-.048	-.048	-.049
Control			-.078	-.084**	-.084**	-.078**	-.078**	-.079**
Support				0.076	0.076	0.084	0.082	0.084
Discr 1					0.000	0.000	0.000	0.000
Discr 2						0.074*	0.074*	0.075*
Discr1*illness							-1.181E-07	-1.748E-07
Discr2*illness								-.001
Constant	.247	.423	.648	.842	.841	.747	.759	.821
R ²	0.01	0.02	0.03	0.03	0.03	0.04	0.4	0.4
N	2934	2674	2667	1945	1867	813	813	800

*p<.05, **p<.01 (Unstandardized, beta coefficients reported)

+Discr1 is discrimination in receipt of medical services

#Discr2 is perceived discrimination

Table 33: Regression Analyses for Predictors on CAM.

	Demog.	Chronic	Control	Support	Discr1	Discr2	Discr1* Illness	Discr2* Illness
Gender	.339*	0.363**	0.367**	0.382**	0.387**	0.390**	0.389**	0.105
Age	-.002	-.002	-.001	-.001	-.001	-.002	-.002	-.003**
Education	0.481**	0.520**	0.500**	0.497**	0.490**	0.487**	0.491**	-.007
Employmt	0.008	0.009	0.008	0.007	0.009	0.009	0.009	-.020
Income	0.068	0.089	0.084	0.086	0.090	0.092	0.091	0.001
Kids	-.079	-.064	-.055	-.037	-.044	-.045	-.045	-.005
Insurance	0.062	0.083	0.074	0.073	0.072	0.074	0.073	-.096
Race	-.096	-.103	-.119	-.114	-.131	-.166	-.15	-.028
Chronic ill		-.176**	-.191**	-.196**	-.196**	-.193**	-.193**	-.049
Control		0.060	0.060	0.046	0.044	0.050	0.049	-.079**
Support				0.153	0.149	0.156	0.155	0.084
Discr 1					0.021	0.022	0.021	0.000
Discr 2						0.066	0.066	0.075*
Discr1*illness+							-1.181E-01	-1.748E-01
Discr2*illness#								-.002
Constant	-.054	.400	.223	.616	.627	.543	.759	.821
R ²	.02	.03	.03	.03	.03	.04	.04	.05
N	2934	2674	2667	1945	1867	813	813	800

*p<.05, **p<.01 (Unstandardized, beta coefficients reported)

+Discr1 is discrimination in receipt of medical services

#Discr2 is perceived discrimination

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