EXAMINING DISPARITIES IN COMPLIANCE IN APPOINTMENT KEEPING

AMONG OLDER ADULT'S WITH DIABETES MELLITUS TYPE 2 WITHIN A

MANAGED CARE SETTING

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAI'I AT MĀNOA IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

IN

SOCIAL WELFARE

DECEMBER 2014

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We certify that we have read this dissertation and that, in our opinion, it is satisfactory in scope and quality as a dissertation for the degree of Doctor of Philosophy in Social Welfare.

ACKNOWLEDGEMENTS

I would like to express my appreciation to the following scholars at the University of Hawai`i, School of Social Welfare who have made it possible for me to complete my dissertation. First, Dr. Colette Browne, my committee chair who has spent endless hours advising, mentoring, and supporting me through this arduous journey. Second, my Ph.D. committee members, including Dr. Fenfang Li, Dr. Rebecca Stotzer, Dr. Bum Jung Kim, and Dr. Valli Kalei Kanuha for dedicating their time and efforts in helping me complete my dissertation.

I would like to express my extreme gratitude to Kaiser Permanente Hawai`i region for making it possible for me to undertake this study. There are several individuals that I would like to acknowledge for without them I would not have been able to complete the doctorate program. First, my colleagues in the social work department including Michelle Loo, Kathleen Mau, and Bernadette Cabilao who allowed me to take time away from work in order for me to pursue my dream in completing my dissertation. Second, Walter Schroeder and Eric Tom who generously shared their time, analytic wisdom, and knowledge of Kaiser Permanente's system and patient population with me. Finally, Don Chock who patiently worked with me on retrieving the data for the study.

I would like to thank my family and friends who had faith in me and remained optimistic that I would complete my dissertation and graduate from the doctorate program. I am extremely grateful to Dr. Dexter Wong who always provided me with steadfast support and constantly encouraged me to finish my dissertation. I am also indebted to Ryan Suenaga who inspired me to undertake this study and my grandmother who always believed in me.

ABSTRACT

In the State of Hawai`i, diabetes mellitus type 2 affects the well-being of many of the state's older adult population. Native Hawaiians and Filipinos are found to be disproportionately impacted by diabetes mellitus compared to Whites. Compliance in appointment making and keeping is an important aspect of self-management for patients with diabetes mellitus type 2.

Compliance in outpatient clinic appointments within 30-days of a patient's hospital discharge play an integral role in the long-term management and monitoring of older adult's diagnosed with diabetes mellitus type 2. Poor compliance in appointment keeping may be a marker of unmeasured social factors that undermine successful diabetes self-management. Therefore, compliance in appointment keeping may assist in the identification of older adults at risk for other diabetes mellitus type 2 adherence behaviors and associated barriers since older adult patients with a poor record of appointment keeping are likely to have issues with other aspects of self-management.

Patient characteristics, such as race/ethnicity or age, may serve as practical ways of identifying patients' at risk for poor compliance. The researcher investigated patients' compliance in appointment keeping among racial/ethnic older adults diagnosed with diabetes mellitus type 2. The researcher aimed to determine if race/ethnicity or age or sex, is a significant predictor of patients' compliance with their pre-scheduled outpatient clinic appointment following their hospital discharge after controlling for sex and glycated hemoglobin (HbA1c). To date, there have been no documented studies that examine racial/ethnic disparities in compliance among older adults with diabetes mellitus type 2 within a large health maintenance organization (HMO) in the State of Hawai`i.

A retrospective cross-sectional research design was employed. The study examined secondary data from Kaiser Permanente Hawai`i region HealthConnect® electronic record system during the study period from January 1, 2004 through December 31, 2009. A total of 3,684 electronic records met the study's inclusion criteria: age 65 years and older, had continuous enrollment in the Senior Advantage health plan during this time period, diagnosed with diabetes mellitus type 2 prior to the onset of the study, had a laboratory confirmed glycated hemoglobin (HbA1c) result within 90-days of discharge from the hospital, had a pre-scheduled follow-up appointment, had an assigned primary care physician, had not been readmitted to the hospital within 30-days of the patient's index discharge date, and had an ICD-9 code 250*.

The statistical analysis consisted of four parts: (a) descriptive analysis was used to describe patients' baseline characteristics and compliance; (b) four univariate binary logistic regressions were used to examine the relationship between patients' race/ethnicity, age, sex, HbA1c and patients' follow-up with their pre-scheduled outpatient clinic appointment; (c) simultaneous logistic regression model tested the hypotheses that patients' compliance with their pre-scheduled outpatient clinic appointment was a function of patients' race/ethnicity or age, after controlling for sex and HbA1c; and (d) an additional model tested the interaction terms between patients' race/ethnicity and sex, and between race/ethnicity and age. These terms were entered simultaneously with patients' race/ethnicity, age, and sex, after controlling for HbA1c. This additional model tested the hypotheses that race/ethnic difference in compliance with pre-scheduled outpatient clinic appointments may depend on either the patients' age or sex.

Results from the four univariate binary logistic regression models found only patients' age was significant in predicting patients' compliance in appointment keeping. No significant associations were found between patients' compliance in appointment keeping and race/ethnic groups. Simultaneous logistic regression results found patients' age remained significant in predicting patients' compliance in appointment keeping, controlling for patients' race/ethnicity, sex, and HbA1c. Those in the age group 75 to 84 years old were 3 times more likely to have compliance in appointment keeping and those in the age group 85 years old and older were 2 times more likely to have compliance in appointment keeping than those in age group 65 to 74 years old.

No significant difference was observed between Native Hawaiian/part-Hawaiian older adults to White older adults, or Chinese older adults to White older adults, or Filipino older adults to White older adults, or Japanese older adults to White older adults, or older adults in the other Asian group category to White older adults, or older adults in the other group category to White older adults. In addition, no significant difference was found between Native Hawaiian/part-Hawaiian older adults to the older adults in the other group category. Results from the additional simultaneous logistic regression model found none of the interaction terms to be significant. Only patients' age remained significant ($p<0.001$).

Health disparities are documented among Hawai`i's multi-ethnic adult population diagnosed with diabetes mellitus type 2. The findings of the current study suggested the HMO model in the State of Hawai`i may be potentially effective in addressing racial/ethnic disparities in compliance. In terms of age and compliance in appointment keeping, findings suggested that disparities continued to exist even among patients who

have medical insurance coverage as well as access to health care. Taken together, these findings have important implications for social policy and practice. The findings of the study have demonstrated that racial/ethnic disparities can be alleviated in certain health care settings with the appropriate practices in place. For example, Kaiser Permanente's integrated approach with a client centered focus may have important implications in care delivery in terms of provider-patient relationship, communication, and treatment of racial/ ethnic older adults diagnosed with diabetes mellitus type 2. This study contributed to the knowledge in disparities in health and health care as well as factors affecting compliance in appointment keeping. Moreover, it formed the foundation to which other studies may be predicated on in the future.

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1. INTRODUCTION

Disparities in health and health care have been acknowledged in the United States (U. S.) for more than a century (Adler, 2006; Campbell, Daigle, & Smulski, 2007; Kaholokula et al., 2008; Kaiser Family Foundation, 2008). A disparity typically implies that the difference is unjust or unfair (Adler, 2006; Carter-Pokras & Baquet, 2002a). The magnitude of the injustice is generally proportional to the degree to which an individual is perceived to have control over the social context and environmental factors in his or her choices in health (Adler, 2006; Herbert, Sisk, & Howell, 2008). A disparity is determined to be problematic depending on who decides what is avoidable or immutable or when the differences are detrimental to groups that are already disadvantaged in opportunity and resources (Adler, 2006; Carter-Pokras & Baquet, 2002a; Herbert et al., 2008).

Relative to the majority population (or group), the population (or group) identified as a disparity population (or group) varies and is typically based on the health indicator used (Adler, 2006). According to the Minority Health and Health Disparities Research and Education Act of 2000, health disparity populations are defined as those for which "there are significant disparities in the overall rate of disease incidence, prevalence, morbidity, mortality or survival rates in the population as compared to the health status of the general population" (Adler, 2006; National Center for Minority Health and Health Disparities, 2000). The landmark 2003 Institute of Medicine (IOM) report, "Unequal Treatment," found that members of certain disparity populations (e.g., racial/ethnic minorities, low-income persons, children, women, older adults, rural and urban residents, persons with disabilities and chronic illness, and persons near the end-of-life) frequently

confront disparities in terms of health status, health care access, and health care quality

relative to the general population (Centers for Disease Control and Prevention, 2011b).

Diabetes Mellitus in the U. S.

Diabetes is a growing epidemic in the United States (U. S.) The prevalence rates

for individuals with diabetes—all ages—range from an estimated 23.6 to 25.8 million (or

7.8% to 8.3% of the total population) (Pobutsky, Balabis, Nguyen, & Tottori, 2010). Of

those estimated 23.6 million to 25.8 million individuals with diabetes, approximately

17.9 to 18.8 million individuals have been diagnosed and approximately 5.7 to 7 million

individuals are undiagnosed (Pobutsky et al., 2010; Centers for Disease Control and

Prevention, 2011b). These estimates are based on the Behavioral Risk Factor

Surveillance System (BRFSS) which are self-reports and does not distinguish between

diabetes mellitus type 1 or diabetes type 2 (Pobutsky et al., 2010). However, other

research and surveillance data on diabetes within the U. S. population indicate that the

vast majority of diabetes cases (90% or more) are diabetes mellitus type 2 (Pobutsky et

al., 2010).

Among racial/ethnic minority groups, Asian-American adults are at an increased

risk for diabetes mellitus type 2 compared with White adults (Fujimoto, 1995; King et al.,

2012; McNeely & Boyko, 2004). In terms of age, approximately 10.9 million older adults

(over the age of 65) (or 26.9% of the total population) have diabetes (Centers for Disease

Control and Prevention, 2011b).

**Diabetes mellitus type 2 in the State of Hawai`i.** In the State of Hawai`i, the

Hawai`i Department of Health (DOH) estimates that 76,000 adults in Hawai`i are

diagnosed with diabetes and approximately 26,000 are undiagnosed (Pobutsky et al.,

2010). Based on the 2010 National Health Interview Survey (NHIS), the age-adjusted percentage of Native Hawaiian and Other Pacific Islanders (NHOPIs) 18 years of age and over diagnosed with diabetes was 23.7% (vs. 7.6% for White adults) (Schiller, Lucas, Ward, & Peregoy, 2012).

Among the various racial/ethnic groups residing in the state, NHOPI adults bear an excess burden of diabetes mellitus health disparities (King et al., 2012; Mau, 2010). NHOPI adults are three times more likely than White adults to be diagnosed with diabetes mellitus (Schiller et al., 2012). In addition, they have higher rates of complications associated with the disease than do White adults (America's Health Rankings, 2011; Centers for Disease Control and Prevention, 2010; Furubayashi & Look, 2005; Hawaii State Diabetes Prevention and Control Program, 2004; Ka'opua, Braun, Browne, Mokuau, & Park, 2011; Kaiser Family Foundation, 2010; Mau, 2011; Mau et al., 2010; Russell, 2010; U. S. Department of Health and Human Services, 2010). The Native Hawaiian only population is reported to have an increased risk of diabetes mellitus type 2 when compared with the other racial/ethnic groups residing in the State of Hawai'i (Grandinetti et al., 1998; Kaholokula, Haynes, & Chang, 2006).

In 2010, approximately 17,000 older adults (65-74 years) were diagnosed with diabetes or 18.6% of the state's older adult population in this age range (Kaiser Family Foundation, 2010). The total number of older adults age 75 years and older, diagnosed with diabetes mellitus was another 17,000 (or 17.6% within this age range) (Kaiser Family Foundation, 2010).

Compliance

The importance of diabetic patients following up with their physician is of great significance in averting any long-term complications or hospitalizations (Griffin, 1998; Kirkman et al., 2012; Shrivastava, Shrivastava, & Ramasamy, 2013). Hospitalization is often a frequent occurrence among patient's diagnosed with diabetes mellitus type 2 (Kirkman et al., 2012; Wheeler et al., 2004; Wheeler et al., 2007). Diabetic older adult patients are at a higher risk of readmission to the hospital than younger adults (Kirkman et al., 2012).

Consequently, successful transitions from the hospital to the outpatient clinic settings for diabetes care is particularly relevant in older adult patients in order to achieve good glycemic control and improved outcomes (e.g., decreased health services utilization and possibly fewer hospitalizations) (Wheeler et al., 2004). Therefore, an integrated care management approach has been a system to which adult patients who have poor glycemic control and who are at risk of diabetic-related complications has proved beneficial for racial/ethnic minority older adults (Wheeler et al., 2004). Primary care physicians (PCPs), central to the integrated care management approach, play an integral role in the detection, long-term management, monitoring, and treatment of the disease (Parker et al., 2011). Health maintenance organizations (HMOs) such as Kaiser Permanente have both features. It has an integrated system in which transitions from the hospital to the outpatient clinic settings can be achieved and it has PCPs that monitor patients progress in treatment (Kaiser Permanente, 2012).

Research Problem and Purpose

Compliance problems are common in diabetic management (Delamater, 2006; Shrivastava et al., 2013). It can be especially problematic for the racial/ethnic older adult patient diagnosed with diabetes mellitus type 2. Compliance is often complicated by a patient's clinical heterogeneity as well as compromised by his or her diabetes-related co-morbidities, cognitive impairment, and psychological issues (California Healthcare Foundation, 2003; De Coster & Cummings, 2005; Huang, Gorawara-Bhat, & Chin, 2008; Kirkman et al., 2012; Lee et al., 2011; Sood & Aron, 2009; Spollett, 2006). Physical limitations, alterations in the activities of daily living, the effects of aging, and other barriers (e.g., financial concerns, insurance issues, and lack of transportation) are reported to impact older adult patients with diabetes mellitus type 2 (Spollett, 2006) and be obstacles to post-discharge follow-up (Wheeler et al., 2007).

Furthermore, sex/gender differences in the perceptions of barriers to post discharge follow-up have been reported among racial/ethnic minority older adult patients (Wheeler et al., 2007). Studies have shown that racial/ethnic minority older adult females (Centers for Disease Control and Prevention, 2001) are particularly at risk due to poverty and experience various obstacles in receiving quality health care services more so than any other group (Jack Jr., 2003; Jack Jr., Boseman, & Vinicor, 2004).

The purpose of the current study was to examine patient characteristics and compliance in appointment keeping in primary care among fully insured with uniformed access older adult patients diagnosed with diabetes mellitus type 2. The culturally diverse population of Kaiser Permanente, the largest health maintenance organization (HMO) in

the State of Hawai`i, provided an advantageous setting in which to study disparities in compliance in appointment keeping.

Studies that examined disparities of diabetes mellitus on Native Hawaiian and other Pacific Islanders (NHOPIs) in the state of Hawai`i have centered on obesity (Aluli, 1991; Maskarinec et al., 2009; Mau et al., 2010), cardiometobolic disorders (Mau, Saito, Baumhofer, & Kaholokula, 2009), dietary patterns (Kim, Park, Grandinetti, Holck, & Waslien, 2008), quality of life (Kaholokula et al., 2006; Kaholokula, Haynes, Grandinetti, & Chang, 2003; Lee, Onopa, Mau, & Seto, 2010), and community education and programs (Lee et al., 2010; Look, Baumhofer, Ng-Osorio, Furubayashi, & Kimata, 2008; Mau et al., 2001; Mau et al., 2010). To date, there were no documented studies that examined racial/ethnic minority disparities in compliance with appointment keeping among older adults diagnosed diabetes mellitus type 2 in a HMO setting in the State of Hawai`i. To address this research gap, the study focused on racial/ethnic minority older adults diagnosed with diabetes mellitus type 2 within Kaiser Permanente's Hawai`i region.

<div align="center">Research Questions and Hypotheses</div>

More specifically, the following research questions and hypotheses were addressed:

Research Question 1

Does race/ethnicity predict compliance with pre-scheduled outpatient clinic appointments following hospital discharge among older adults diagnosed with diabetes mellitus type 2 after controlling for sex, age, and glycated hemoglobin (HbA1c)?

Hypothesis 1.1. The study expected that race/ethnicity would emerge as a significant predictor of compliance among older adults diagnosed with diabetes mellitus type 2 in their following up with pre-scheduled outpatient clinic appointments after being discharged from the hospital, after controlling for sex, age, and HbA1c.

Hypothesis 1.2. In particular, Native Hawaiian/part-Hawaiian older adults diagnosed with diabetes mellitus type 2 would have lower rates of compliance with their pre-scheduled outpatient clinic appointments following their hospital discharge than White older adults, after controlling for sex, age, and HbA1c.

Research Question 2

Does age predict compliance among older adults diagnosed with diabetes mellitus type 2 following their hospital discharge after controlling for race/ethnicity, sex, and HbA1c?

Hypothesis 2.1. The study expected age to be significantly associated with compliance even after controlling for sex, race/ethnicity, and HbA1c.

Research Question 3

Does race/ethnicity interact with age and sex in predicting compliance among older adults diagnosed with diabetes mellitus type 2 following a hospital discharge?

Hypothesis 3.1. The study hypothesized that racial/ethnic differences in compliance with pre-scheduled outpatient clinic appointment might depend on the patient's sex or age.

Research Design

A retrospective cross-sectional research design using secondary data from Kaiser Permanente's computerized medical records was chosen to address the three research

questions. The sample consisted of 3,684 unique patients who met the inclusion criteria of being age 65 years and older, consecutively enrolled in the Kaiser Permanente Senior Advantage health plan for the years between January 1, 2004 to December 31, 2009, had an HbA1c result within 90-days prior to being discharged from the patients' hospital, had a pre-scheduled follow-up appointment with the outpatient clinic within 30-days of discharge from the hospital, had an assigned PCP, and had an ICD-9 code 250*.

Theoretical Perspectives on Racial/Ethnic Disparities and Compliance

This study drew on ideas and concepts from three established theoretical frameworks to guide the study. These were the Life-Course Explanation, Minority Stress Theory, and the Health Belief Model (HBM). Both the life course explanation and minority stress theory are increasingly used to understand and explain behaviors in racial/ethnic minority and older adult populations (Browne, Mokuau, & Braun, 2009; Dovideio, Ka`opua, Meyers, & Hwang, 2004). The HBM is one of the more widely used and tested theoretical frameworks for studies on health practices, but more recently has been criticized for its neglect of race/ethnicity, its tendency to focus on conditions thought to be peculiar to them, and its lack of attention to the potential impact of socio-historical forces and discrimination on health practices, status and outcomes (Carpenter, 2010; Glanz & Bishop, 2010; Kaholokula & Nacapoy, 2010; Pfeffer & Moynihan, 1996). Therefore in the absence of a comprehensive theory that explains health disparities and compliance behavior applicable to older adults with diabetes mellitus type 2, components within each theoretical framework provide the foundation from which the study's research question and hypotheses are derived from as well as guide in the interpretation and understanding of the study's outcomes.

Life-Course Explanation

The life-course explanation (also known as the life-course perspective or life-course theory) was selected because it aids in the understanding of how early life conditions are important determinants for late-life differences (Barker, 1992, 1998; Barker & Clark, 1997; Bartley, 2004; Ben-Shlomo & Smith, 1991; Browne, Mokuau, & Braun, 2009; Hertzman, 2004; Milkie, Bierman, & Schieman, 2008). The life-course explanation is a theoretical model that refers to a multi-disciplinary paradigm for the study of individual's lives, structural contexts, and social change (Dannefer & Settersten, 2010; Hutchison, 2007; Kok, 2007). A life-course can be defined as the sequence of positions of a particular individual in the course of time (Kok, 2007). It is seen as a succession of events and activities in different stages of an individual's life and in institutional settings that are subject to many influences (Leys & Rouck, 2005).

In terms of the older adult and diabetes mellitus type 2, health conditions that arise during the individual's working years may significantly affect earnings and wealth accumulation. Recent works have documented the link between health problems and the reductions in income and wealth at older ages (Crimmins, Hayward, & Seeman, 2004; Hummer, Benjamins, & Rogers, 2004; Karel, 1997; Myers & Hwang, 2004; S. H. Preston & P. Taubman, 1994; Smith & Kington, 1997; Smith, 1999). Furthermore, the lifetime inequalities encountered by racial/ethnic populations in the forms and frequency of discrimination has shown to contribute to late life health disparities and its effects may influence their access to care (Gee, Walsemann, & Brondolo, 2012).

The role of personal and social resources. The role of personal and social resources may provide various ways that racial/ethnic older adults cope with unfavorable

circumstances, such as avoiding physical or mental illnesses as well as moderating the severity of it. Some social gerontologists conceptualize personal and social resources as a series of assets that accrue over time as a result of the older adult's linkage to or interactions with the resource (Mendes de Leon & Glass, 2004). Personal resources encompass assets that place primary emphasis on the individual and have been conceptualized in terms of psychological attributes linked with health outcomes (Mendes de Leon & Glass, 2004; Myers & Hwang, 2004) or in terms of social class or position (e.g., political and economic assets) that has been associated with significant health disparities (Crimmins et al., 2004). Social resources are categorized into social and community networks and emphasis the social or structural nature of the asset (Mendes de Leon & Glass, 2004). Both personal and social resources nurtured or developed over the life course are considered an asset and provide the older adult a means through which resources are accessed and mobilized.

In terms of the racial/ethnic older adult, both personal and social resources are hypothesized to be associated with tangible health benefits (Geertsen, 1997; Mendes de Leon & Glass, 2004). Since the 1970's, substantial evidence that personal and social resources may reduce the risk of morbidity and mortality outcomes has accumulated over the years (Berkman & Syme, 1979; Blazer, 1982; Bobak, Pikhart, Hertzman, Rose, & Marmot, 1998; Dalgard & Lund, 1998; House, Landis, & Umberson, 1988; House, Robbins, & Metzner, 1982; Kaplan, Seeman, Cohen, Knudsen, & Guralnik, 1987; Kawachi et al., 1996; Mendes de Leon & Glass, 2004; Orth-Gomer & Johnson, 1987; Schoenbach, Kaplan, Fredman, & Kleinbaum, 1986; Seeman, 1996; Seeman & Crimmins, 2001).

Personal and social resources over the life-course. The survival benefit and protective effect of personal and social resources appear not to diminish at older ages and the effects have been found to extend into older adulthood (Mendes de Leon & Glass, 2004). Nonetheless, the role of personal and social resources in explaining the origins and consequences of racial/ethnic disparities in late-life health are likely to differ substantially across racial/ethnic groups. The relatively unique social experiences and conditions of racial/ethnic sub-populations may contribute to important variations in the personal and social resources that are accumulated throughout life. From the life-course explanation, individuals actively regulate personal and social resources as they age for the purpose of personal growth and adaptation (Baltes & Lang, 1997; Lang, 2001; Lang, Featherman, & Nesselroade, 1997; Mendes de Leon & Glass, 2004; Ryff, 1991). This is modulated in important ways by the sociocultural environment of racial/ethnic older adults through which prevailing norms, values, and expectations, shape and reinforce an individual's resources that optimize adaptation (Mendes de Leon & Glass, 2004; Verbrugge & Jette, 1994).

Minority Stress Theory

The second conceptual framework the study drew from was the minority stress theory (sometimes referred to as the minority stress model). According to the minority stress theory, an individual's position in the social structure (e.g., living in poverty) and/or the holding of a status that is stigmatized or devalued by society (e.g., a particular race/ethnicity, gender, sexuality, or religion) exposes an individual to stressors, which over time leads to chronic stress outcomes (Meyer, 2003). Stressors are defined as events or conditions (e.g., external, environmental, or social factors, or internal, biological or

psychological factors) that challenge an individual to change or adapt to the new situation or life circumstance (Meyer, 2003). The underlying assumption is that minority stress is unique (not experienced by non-stigmatized populations), chronic (e.g., related to social and cultural structures), and socially based (e.g., social processes, institutions, and structures) (Dentato, 2012; Meyer, 2003).

The minority stress theory is useful in understanding issues and conditions to which individuals from stigmatized social categories are exposed to as a result of their social, often minority, position (Meyer, 2003). For example, chronic stressors (e.g., poverty, hostile and stressful environment) are common occurrences for racial/ethnic minority groups (e.g., Asian-Americans, Native Hawaiians, and other Pacific Islanders) and the psychological and physiological effects are shown to be detrimental to their health and well-being (American Psychological Association, 2013; Ka'opua et al., 2011; Kansagara et al., 2011; Meyer, 2003). However, their unique experiences, their appraisal of the stressfulness of the event, and the availability of resources to mitigate the stressor is suggested to lead to differences in the general health and mental health of racial/ethnic minority groups (Ka'opua et al., 2011; Mau, 2010; Srinivasan & Guillermo, 2000).

Moreover, racial/ethnic minority groups are often exposed to frequent psychological stressors (e.g., perceived racism, perceived stigma, or perceived discrimination). These stressors experienced by racial/ethnic minority groups over time have been suggested to have an influential affect in racial/ethnic minority group's interaction with the health care system (Browne et al., 2014; Ka'opua et al., 2011). For some Asian-Americans, Native Hawaiians, and other Pacific Islanders, the long history of discrimination and their unique experiences with the social, political, and economic

system are associated with obstacles to gaining access to and using health care services (Dovidio et al., 2008; Gregg et al., 2010; Institute of Medicine, 2003a; Kim, Sinco, & Kieffer, 2007; Scheppers, Dongen, Dekker, Geertzen, & Dekker, 2006; Srinivasan & Guillermo, 2000).

Health Belief Model (HBM)

The Health Belief Model (HBM) was the third conceptual framework that anchors this study. It is based on value-expectancy and motivation theories (Gochman, 1997b; Rutter, Quine, & Chesham, 1993). The HBM was selected because it is a practical model to explain compliance in seeking care and medical care recommendations. The HBM is a well-researched model that has long been considered to be the major conceptual frame of reference in health behavior research (Gochman, 1997b; Rosenstock, 1985; Rutter et al., 1993). The HBM relates the value-expectancy theory of decision-making to individual's behaviors (Harris & Linn, 1985; Jones, Jones, & Katz, 1988; Vermeire, Hearnshaw, Van Royen, & Denekens, 2001). It assumes that an individual's behavior is determined more by an individual's perceived reality and expectation than by the objective environment (Harris & Linn, 1985; Jones, Jones, & Katz, 1988; Vermeire, Hearnshaw, Van Royen, & Denekens, 2001).

The HBM focuses on two aspects of individuals' representation of health and health behavior: threat perception and behavioral evaluation. Threat perception was construed by two key beliefs: 1) perceived susceptibility to illness or health problems and 2) anticipated severity of the consequences of the illnesses. Behavioral evaluation consisted of two distinct set of beliefs: 1) those concerning the benefits (or efficacy) of a recommended health behavior and 2) those concerning the cost (or barriers) of enacting

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the behavior. The model proposed cues to action that activate health behavior when appropriate beliefs are held (Rosenstock, 1985).

The HBM has historically been used to study patients' attitude towards disease and to understand and predict compliance (Bloom Cerkoney & Hart, 1980; Chatterjee, 2006; Harris & Linn, 1985; Wens, Vermeire, Royan, Sabbe, & Denekens, 2005). Components of the health belief model (HBM) have been used in previous studies in the analysis of compliance behavior (Ajzen & Fishbein, 1980; Becker, Drachman, & Kirscht, 1972; Bloom Cerkoney & Hart, 1980; Fincham & Wertheimer, 1985; Harris & Linn, 1985; Janz & Becker, 1984; Kirscht, Becker, & Eveland, 1976; Lousteau, 1979; Macrae, 1984; Wens et al., 2005), to examine factors influencing attendance behavior with health services (Dryden, Williams, McCowan, & Themessl-Huber, 2012; Hsu & Gallinagh, 2001; Jones et al., 1988; Norman & Fitter, 1991; Shiloh, Vinter, & Barak, 1997), and to understand patient's compliance behavior among diabetic patients (Alogna, 1980; Bloom Cerkoney & Hart, 1980; Boom & Hart, 1980; Chatterjee, 2006; Harris & Linn, 1985; Rosenstock, 1985; Wens et al., 2005).

Among patients' with diabetes mellitus type 2, compliance with self-care activities (e.g., following up with scheduled clinic appointments) and physician recommendations are important (Chatterjee, 2006; Delamater, 2006; Rosenstock, 1985). Therefore, the HBM is applicable to the current study because one determinant that has been postulated to influence patients' compliance in seeking care and adopting health promoting regimens was the patient's perception of the seriousness of the illness and the severity of the symptoms (Chatterjee, 2006; Schectman, Schorling, & Voss, 2008). Studies that examined variables of the HBM and its relationship to compliance with

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treatment regimen found compliance to be positively associated with perception of susceptibility to illness (Becker et al., 1972; Gordis, Markowitz, & Lilienfeld, 1969; Macrae, 1984), perceived seriousness (Gordis et al., 1969; Harris & Linn, 1985; Kirscht et al., 1976; Macrae, 1984), and the perception that the recommendation would reduce the illness threat (e.g., costs minus benefits of action) (Fincham & Wertheimer, 1985).

Other studies have found that different perceptions of the severity of symptoms and the seriousness of the symptoms influence the degree of urgency in seeking care among racial/ethnic minority groups (Schectman et al., 2008). Among older adult patients, studies have found different perceptions regarding components of diabetes mellitus type 2 care (Freeman & Loewe, 2000; Huang et al., 2008; Hunt & Arar, 2001; Hunt, Pugh, & Valenzuela, 1998). For example, a qualitative study by Huang and colleagues (2008) identified maintaining independence as a primary health goal as the motivating factor for patients aged 75 years and older when compared to those younger than 75 years old (Huang et al., 2008). The results suggest that older adult patients living with diabetes mellitus type 2 may not distinguish between the prevention of different complications or between the importance of distinct treatments (Huang et al., 2008).

However, the HBM has been faulted for its neglect of race/ethnicity, its lack of attention to the potential impact of race/ethnicity and socio-historical forces and discrimination on health, and it does not specify how different constructs of the framework interact with one another.

Definitions and Terms

The following section defines the various terms used in the study.

Health Disparity

In the United States (U. S.), the term health disparity is commonly used whereas researchers in Europe and Great Britain more frequently report on health inequality (Adler, 2006). The term generically refers to any differences in health experienced by one group versus the general population (Adler, 2006; Braveman, 2009). In the U. S., there is a general agreement about the problematic nature of disparities; however, there remains no consensus on the conceptual definition of a health disparity (or health inequality) or what constitutes a disparity (Adler, 2006; Herbert et al., 2008). In addition, there is no consistent agreement on how to measure a disparity or the groups of variables to be compared (Adler, 2006).

Several governmental and advisory bodies have attempted to define health disparities (Carter-Pokras & Baquet, 2002a; Meyers, 2007). Variations in the definition are based on the following factors: health care (access to and quality of health care services) versus health (health status and outcomes, often including health care factors); subpopulations based on race/ethnicity versus other characteristics such as income, educational level, geographical area, language preference, gender, sexual orientation, or age and any differences in health status versus differences in terms of clinical need, patient preferences, or appropriateness of intervention (Carter-Pokras & Baquet, 2002a; Meyers, 2007). Other definitions of health disparities include factors such as education, income, socioeconomic status (SES), geographic location, sex (or gender), and rural/urban residence (Adler, 2006).

A central aspect of most accepted definition of a health disparity is that not all differences in health status between social groups (e.g., socioeconomic, racial/ethnic,

gender) are considered to be disparities, only differences which systematically and negatively impact less advantaged groups are classified as disparities (Braveman, 2007; Dehlendorf, Bryant, Huddleston, Jacoby, & Fujimoto, 2010; Herbert et al., 2008). The variety of definitions and their distinctions reveal different ways of thinking about potential solutions to the problem (Carter-Pokras & Baquet, 2002a; Kaiser Family Foundation, 2008).

For the purpose of the study, the definition of health disparity was based on the Center for the Study of Cultural Diversity in Healthcare definition of health disparity, which is defined as "*...significant differences or gaps in health outcomes within and across populations*" (Center for the Study of Cultural Diversity in Healthcare, 2006).

Diabetes Mellitus (DM)

Diabetes mellitus is a chronic metabolic disease involving abnormalities in the body's ability to produce and/or properly use insulin (American Diabetes Association, 2012). Insulin is a polypeptide hormone secreted by the islets of Langerhans that is needed to convert sugar, starches and other food (e.g., glucose to glycogen) into energy needed for daily life (American Diabetes Association, 2012). There are two main types of diabetes: Type 1 and Type 2 (American Diabetes Association, 2012; Khardori, 2012).

Diabetes mellitus type 1 is an autoimmune disease in which the body's immune defense system mistakenly attacks and destroys the insulin-producing beta cells of the pancreas and is prone to ketoacidosis (American Diabetes Association, 2012). Patients require lifelong insulin administration to sustain life (American Diabetes Association, 2012). This is in the form of multiple daily injections or via an insulin pump to regulate their blood glucose levels.

Diabetes mellitus type 2, the most common form of diabetes, comprises an array of dysfunctions resulting from the combination of resistance to insulin action and inadequate insulin secretion (American Diabetes Association, 2012; Khardori, 2012). Patients may produce insulin, but they cannot use it effectively. Unlike diabetes mellitus type 1, patients with diabetes mellitus type 2 are not absolutely dependent upon insulin for life (Khardori, 2012). Diabetes mellitus type 2 is initially managed by exercise, diet modifications, and monitored by physician (American Diabetes Association, 2012; Khardori, 2012). Compliance in appointment keeping with health care providers is an important component in the monitoring and prevention of the disease (Parker et al., 2011). In those patients who are on insulin, there is typically the requirement to routinely check their blood sugar levels (American Diabetes Association, 2012).

Patients with a diagnosis of diabetes mellitus type 2 were the focus of the study. The International Statistical Classifications of Diseases version 9 clinical modification (ICD-9-CM), codes used for diagnosis purposes, were used to define patients with specific diseases, injuries, symptoms, and conditions (ICD-9Data.com, 2012; Torrey, 2009). Patients with an ICD-9 code 250* were diagnosed with having diabetes mellitus type 2. The diagnosis code 250* excludes: gestational diabetes, hyperglycemia NOS, neonatal diabetes mellitus, and non-clinical diabetes (ICD-9Data.com, 2012).

Hemoglobin A1c (HbA1c) Test

The HbA1c test is currently one of the best ways to check whether or not a patients' diabetes is under control (Medweb, 2012). The HbA1c test is not the same as the glucose level (Medweb, 2012). Glucose levels fluctuate from minute to minute, hour

to hour, and day to day. The HbA1c level changes slowly, over 10 weeks, so it can be used as a quality control test (Medweb, 2012).

Optimal hemoglobin A1c levels are defined as ≤ 7.0% (Korc, 2010; Lee et al., 2010). The Healthcare Effectiveness Data and Information Set (HEDIS), a tool used by more than 90 percent of America's health plans (NCQA, 2012), define poor HbA1c control as HbA1c level more than 9.5% (Karter et al., 2004). For the older adult, the American Diabetes Association recommends a less stringent target HbA1c level of less than 8% (Karter et al., 2004; Korc, 2010). For the purpose of the paper, HbA1c level was used as another indicator to identify patients with diabetes mellitus type 2.

Older Adult

The older adult is a heterogeneous population. They can be characterized as being healthy and living independently in the community, or persons with chronic illnesses/conditions that reside in the community with informal or formal support services, or those with multiple, complex health care problems that are institutionalized in a long-term care setting (Executive Office on Aging, 2013).

For the purpose of the study the "older adult" was defined as an individual aged 65 years and older. The U. S. Census 2010, the federal government (e.g., Social Security Administration, Administration on Aging), and most researchers use age 65 as a chronological demarcation of the age boundary for the older adult (American Psychological Association, 2006; National Research Council, 2001). Subgroups were defined as ages 65-74, ages 75-84, and ages 85 and over (American Psychological Association, 2006).

Race/Ethnicity

The term "race" has traditionally been used to refer to groups of people who are thought to differ from each other in some biological way (e.g., basis of physical characteristics, especially skin color), whereas, "ethnicity" refers to cultural differences (e.g., language, religion, history, and customs) (Bartley, 2004; National Research Council, 2004a). The United States Census is a population census that is based on actual counts of persons dwelling in U. S. residential structures (http://www.census.gov/). The U. S. Census has classified people into racial groups since its inception in 1790 (Sandefur, Campbell, & Eggerling-Boeck, 2004).

Over the decades, political views and economic forces have shifted, thus, shaping and changing the collection of data on the U. S. Census (e.g., the list of categories have been modified and the method of measuring race/ethnicity have changed) (Sandefur et al., 2004). Prior to 1977, the U. S. government defined four racial categories: White, Black or African Americans, American Indian/Alaskan Native, and Asian or Pacific Islander (Bartley, 2004). In 1997, the Office of Management and Budget (OMB) announced new standards for federal data on race and ethnicity (Sandefur et al., 2004).

Following the OMB standards, five racial categories were distinguished in the official U. S. government statistics. For the first time, Native Hawaiian or other Pacific Islander (NHOPI) groups were separated from the Asian category. The 2000 Census Bureau also added a sixth category, "some other race" (Sandefur et al., 2004). An additional distinction is made between Hispanics or Latinos and all others, this being described not as a race but as an ethnic group that crosscuts the racial distinction (Bartley, 2004; Sandefur et al., 2004). The 2000 Census also allowed respondents to choose or

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self-identify more than one racial category (National Research Council, 2004a; Sandefur et al., 2004). Self-identification has been used in the Census since 1970 (National Research Council, 2004a; Sandefur et al., 2004). Prior to that, enumerators answered the race question based on their perception of the individual (Sandefur et al., 2004).

Therefore, self-identification of belonging to a racial/ethnic category is based on an individual's racial/ethnic identity. Scholars have proposed various theories to explain racial/ethnic identity. The social constructionist paradigm is the most prevalent view on racial/ethnic identities (Banton, 1998; Cornell & Hartmann, 1998; Nagel, 1996; Sandefur et al., 2004). The basic premise is that within this system "the construction of ethnicity is an ongoing process that combines the past and the present into building material for new or revitalized identities and groups" (Nagel, 1996; Sandefur et al., 2004). The categories of race are primarily social constructions and have changed over time. Nonetheless, the ways in which one measures racial/ethnic identity has important implications for understanding racial/ethnic disparities, particularly in health among the older adult. It is important to note that individuals "self-identify" which racial or ethnic category they associate with based on their perception of their own socially constructed identity.

The 2010 U. S. Census Bureau categories on race and ethnicity officially recognized five races: White, American Indian and Alaska Native, Asian, Black or African-American, Native-Hawaiian and Other Pacific Islander (U. S. Census Bureau, 2010a, 2010e). For respondents unable to identify with any of the five race categories, the U. S. Census Bureau included a sixth category – Some Other Race.

These aforementioned categories were listed in Kaiser Permanente HealthConnect® system. In addition, Kaiser Permanente HealthConnect® further

differentiated these races into various sub-groups. These sub-groups (e.g., Native Hawaiian, Japanese, Chinese, Filipino, etc.) are prevalent racial/ethnic groups in the State of Hawai'i. Therefore for the purpose of the study, the 2010 U. S. Census Bureau provided the basic premise to which the racial/ethnic categories were selected and Kaiser Permanente HealthConnect® system provided the sub-groups from which the racial/ethnic groups were chosen.

Asian-Americans (AA). The 2010 U. S. Census defines Asian-Americans as people having origins in any of the original people of the Far East, Southeast Asia, or the Indian subcontinent (King et al., 2012; U. S. Census Bureau, 2010d; U. S. Department of Health and Human Services, 2012). The Asian-American population is the fastest growing population in the U. S., having expanded six times faster than the general population between 2000 and 2010 (King et al., 2012; McNeely & Boyko, 2004).

 In 2010, the following states have the largest Asian-American populations: California, New York, Hawai`i, Texas, New Jersey, Illinois, Washington, Florida, Virginia, and Pennsylvania (U. S. Department of Health and Human Services, 2012). Together, these ten states represent nearly three-fourths of the entire Asian-American population in the U. S. (U. S. Census Bureau, 2010d).

Asian-Americans are often grouped together and considered as a single homogenous entity. While there are some commonalities across ethnic sub-groups, Asian-Americans are a heterogeneous group with diverse languages, cultures, and histories (City-Data.com, 2010; Harada et al., 2012; King et al., 2012). The differences among different Asian-Americans are related to each group's history in the U. S. (City-Data.com, 2010).

Native Hawaiian and Other Pacific Islander (NHOPI). In the 2000 U. S.

Census, the Native Hawaiian and Other Pacific Islander population was classified

separately from the Asian population (Hixson, Hepler, & Kim, 2012) (Hixson, Hepler, &

Kim, 2010). In the 2010 U. S. Census, NHOPI population category includes people who

indicated their race(s) as Native Hawaiian, Guamanian or Chamorro, Samoan, or Other

Pacific Islander (Hixson et al., 2012). It also includes entries such as Polynesian (such as

Tahitian, Tongan, and Tokelauan), Micronesian (such as Marshallese, Palauan, and

Chuukese), and Melanesian (such as Fijian, Guinean, and Solomon Islander) (Hixson et

al., 2012). The NHOPI population was the race group most likely to report multiple races

in 2010, as more than half (56%) reported multiple races (Hixson et al., 2012).

In 2010, two states had the largest NHOPI population—Hawai`i and California.

Together, these two states had over half (52%) of the NHOPI alone-or-in-combination

population in the U. S. (Hixson et al., 2012).

Similar to that of Asian-Americans, NHOPI are grouped together as a single

homogenous entity and yet are also diverse in their languages, cultures, geography, and

history (Hixson et al., 2012; King et al., 2012).

Native-Hawaiian (NH). In the State of Hawai`i, the definition of Hawaiian varies

by federal, state, and private agencies. The Office of Hawaiian Affairs (OHA) lists 19

different federal and state methods for identifying a member of the Hawaiian race. Some

depend on self-identification, some are based on blood quantum, others on genealogical

research. For this study, the term "Native-Hawaiian/part-Hawaiian" refers to patients that

self-reported themselves as belonging to one racial/ethnic group - Native Hawaiian/part-

Hawaiian.

Health Maintenance Organization (HMO)

The type of managed care plan described in this study is the health maintenance organization or HMO. A federally qualified HMO is defined as an insurance plan under which the HMO controls all aspects of the health care of the insured (Medline Plus, 2008). A subscriber fee (premium) per month, paid by a group (e.g., federal or state employer) or individual member, allows members access to a panel of employed physicians or a network of doctors and facilities (e.g., hospitals) (Medline Plus, 2008). A primary care physician or primary care provider (PCP) is responsible for the overall care of each member assigned to that physician. In addition, any specialty services require a specific referral from the member's assigned PCP. Services that are either not pre-authorized by the PCP or situations that are not defined by the HMO are not covered benefits of the plan (Medline Plus, 2008).

For the purpose of the study, the HMO examined was Kaiser Permanente. Kaiser Permanente is the largest managed care organization in the U. S. (Kaiser Permanente, 2013a). Kaiser Permanente, Hawai`i region is the state's largest HMO (Kaiser Permanente, 2013a). It is a not-for-profit, prepaid, fully integrated health care delivery system that provides comprehensive medical services to over 200,000 members (Kaiser Permanente, 2013a).

Compliance

Compliance is the term used for following a recommended treatment regimen and is relevant to all aspects of medical care, including diabetes mellitus type 2 (Chatterjee, 2006; Kahn et al., 2012; Shrivastava et al., 2013; Vermeire et al., 2001). Compliance can be defined as patients adhering to or following up with recommended follow-up care

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(Eggleston, Coker, Das, Cordray, & Luchok, 2007). Most studies use a restricted time frame for compliance that ranged from receipt of follow-up care within 4-6 weeks (Eggleston et al., 2007). Other studies measured compliance by the number of follow-up appointments kept or by the number of ever completing the recommended procedure, or by adhering within the timeframe set by the physician (Eggleston et al., 2007).

For the purpose of the study compliance was operationalized as patients following up with their pre-scheduled appointments within 30-days of the patients' index discharge date.

Organization of the Study

The remaining chapters described the major aspects of the study. Chapter 2 included a review of the literature on the subjects of health disparity, compliance in appointment keeping, and the older adult. Special attention was focused on disparities in the State of Hawai`i and among older adults. Chapter 3 described the research design, research questions and hypotheses, and data collection methods. Chapter 4 described the statistical analysis and summarizes the key findings from the analysis. Chapter 5 presented a discussion on the study's results. This discussion included various explanations to the study's findings. In addition, the chapter underscored policy and practice implications as well as social work implications that the study's findings reveal. Moreover, it acknowledges the limitations of the current study and highlights future research opportunities.

2. LITERATURE REVIEW

The social welfare issue that this study examined was disparities in compliance in appointment keeping among older adult patients. The researcher examined electronic records of a multicultural sample of older adult patients diagnosed with diabetes mellitus type 2 within Kaiser Permanente, Hawai`i region. The researcher was interested to know whether or not patient characteristics predicted compliance in appointment keeping in an integrated health care system. Findings may help identify at risk groups and provide opportunities for practice and policy improvement.

An extensive review of the literature was presented in this section which highlighted factors that have been found to explain health disparities as well as issues related to compliance with medical care, compliance in diabetes mellitus type 2 and compliance with appointments. Special attention was focused on disparities in the State of Hawai`i and the impact of diabetes mellitus type 2 on racial/ethnic minority older adults. Furthermore, the key variables in the current study as well as the rationale for selecting the variables, based on the literature review, were presented in this section.

Explanations of Health Disparities

The nation's concern over the health and well-being for all Americans has led to an increased focus on health disparities. Studies that investigated the underlying causal pathways behind disparities in health outcomes have focused on a particular factor or set of factors such as biology and individual choices (Dovidio et al., 2008). The former was modified in some cases by genetics and the latter was found to be strongly influenced by economic, social, and cultural conditions (Dovidio et al., 2008). Other researchers have attributed the differences to inequities in life histories and opportunities, perhaps from

exposure to unhealthy living environments or stressors (Dovidio et al., 2008; Faber &

Krieg, 2002), or in lack of access to or the inadequacy of medical care (Chandra &

Skinner, 2004; Dovidio et al., 2008; Institute of Medicine, 2003a; Johnson, Saha,

Arbelaez, Beach, & Cooper, 2004; Nicklett, 2011; Scheppers et al., 2006; Shi, Tsai,

Higgins, & Lebrun, 2009), or differences in health-related attitudes and behaviors

(Dovidio et al., 2008).

Socioeconomic Status (SES)

However, the most fundamental determinant of health disparities cited by most

researchers was found to be associated with socioeconomic status (SES) (Adler &

Newman, 2002; Haviland, Morales, Dial, & Pincus, 2005). Socioeconomic status,

whether assessed by income, education, or occupation, was linked to a wide range of

health outcomes (Adler et al., 1994; Adler, Boyce, Chesney, Folkman, & Syme, 1993;

Marmont, Kogevinas, & Elston, 1987; Marmont, Ryff, Bumpass, Shipley, & Marks,

1997; Meyers, 2007; National Research Council, 2004b; Preston & Taubman, 1994;

Williams, 1990; Winkleby & Cubbin, 2004) and was frequently implicated as a

contributor to health disparities observed among racial/ethnic groups, females, and the

older adult population (Shavers, 2007).

Researchers who examined SES and health disparities have found evidence which

indicated that individuals of low-socioeconomic status have a greater likelihood to suffer

from disease, to experience some form of chronic physical disability and/or mental

impairment, have shorter life expectancy, and higher mortality (Adler et al., 1994; Adler

et al., 1993; Marmont et al., 1987; Marmont et al., 1997; National Research Council,

2004b; Preston & Taubman, 1994; Williams, 1990).

Compliance with Medical Care

Researchers have found that SES influences an individual's ability to obtain health coverage which in turn had a direct effect on access to medical care (Centers for Disease Control and Prevention, 2012; Dovidio et al., 2008; Scheppers et al., 2006; Shi et al., 2009). Researchers have shown that the lack of access to medical care and services by lower income and less educated populations have been associated with worse health outcomes, greater disease burdens, higher death rates, and shorter lives when compared to higher income and more educated populations (Centers for Disease Control and Prevention, 2011a; Dovidio et al., 2008; Krueger & Chang, 2008; Winkleby & Cubbin, 2003).

Health Insurance Coverage

Health insurance coverage was hypothesized to be a mediating variable between health disparities and medical care access (Centers for Disease Control and Prevention, 2012; Flores & Vega, 1998; Jenkins, Le, McPhee, Stewart, & Ha, 1996; Jones, Cason, & Bond, 2002; Scheppers et al., 2006; Smith, Kreutzer, Goldman, Casey-Paul, & Kizer, 1996). Health insurance coverage played a role in determining whether, when, and where individuals received care. The inability to obtain health insurance coverage or the lack of adequate health insurance coverage created challenges for individuals seeking or receiving medical care treatment (Centers for Disease Control and Prevention, 2012; Flores & Vega, 1998; Jones et al., 2002; Scheppers et al., 2006; Smith et al., 1996).

Health insurance coverage was the determining factor when it comes to entry into the health care system and to have access to a usual source of care (Flores & Vega, 1998; Jenkins et al., 1996; Lipton, Losey, Giachello, Mendez, & Girotti, 1998; Scheppers

et al., 2006; Weissman, Stern, Feilding, & Epstein, 1991; Wright & Joyner, 1997). Researchers have found that having a regular source of care was one of the strongest indicators of preventive health care use (Jenkins et al., 1996; Scheppers et al., 2006).

Individuals with no health insurance coverage were found to be three times more likely to delay seeking care, and between three and five times less likely to obtain medical and/or surgical care, dental care, or prescription drugs than those individuals who had health insurance coverage (ACP, 1999; CEA, 2000). For Hispanics adults and African American adults, researchers have found evidence that health insurance explained anywhere from 5 % to 42% of the disparity in access to a usual source of care when compared to White adults (Meyers, 2007).

Access to Medical Care

Researchers also suggested that the correlation between racial/ethnic minority group status and health outcomes was confounded by differential access to medical services (Dovidio et al., 2008; Harris, 2001; Institute of Medicine, 2003a; Kaiser Commission on Medicaid and the Uninsured, 2006; Meyers, 2007; Mills, 2000; Scheppers et al., 2006). Racial/ethnic minority adults may encounter challenges in having access to medical care in the U. S. (Dovidio et al., 2008; Gregg et al., 2010; Institute of Medicine, 2003b; Kim et al., 2007; Scheppers et al., 2006) and even when they receive it, their care may not be equivalent to that of other groups (Adler & Newman, 2002; Cooper-Patrick et al., 1999; Hasnain-Wynia et al., 2007; Institute of Medicine, 2003b; Lauderdale, Wen, Jacobs, & Kandula, 2006; Ngo-Metzger, Legedza, & Phillips, 2004; Scheppers et al., 2006; Shi et al., 2009; Sofaer & Gruman, 2003; Sorkin, Ngo-Metzger, & De Alba, 2010). Researchers have found that low-income older adults and racial/ethnic

minority adults were more affected than White adults in accessing and receiving medical care (Asch, Sloss, Hogan, Brook, & Kravitz, 2000; Fiscella, Franks, Gold, & Clancy, 2000; Harris, 2001; Kim et al., 2007; National Research Council, 2004c).

Provider Behavior

Beyond the effects of SES, health insurance coverage, and access to medical care, individual provider behavior was implicated in racial/ethnic minority group disparities in health and in medical care outcomes (Dovidio et al., 2008; Scheppers et al., 2006). Psychological factors such as provider prejudice, stereotyping, and discrimination against different racial/ethnic minority groups may indirectly influence provider clinical decision making and result in disparities in quality of medical care (Dovidio et al., 2008; Scheppers et al., 2006).

Provider prejudice, stereotyping, and discrimination. Disparities in medical care may be due to provider held beliefs (e.g., prejudice, stereotyping, and discrimination) against different racial/ethnic minority groups (DiMatteo, 1997; Meyers, 2007; Smedley, Stith, & Nelson, 2002). According to Dovidio and colleagues (2008), prejudice reflected a general negative evaluation or orientation to a group or a member of a group whereas stereotyping involved the association or attribution of specific characteristic or members (Dovidio et al., 2008). Both prejudice and stereotyping can produce discrimination, an unfair or unjustified group-based difference in behavior that systematically disadvantages members of marginalized groups (Dovidio et al., 2008).

Some researchers have found that health care providers interpreted symptoms in line with their beliefs about racial/ethnic minority group differences (Dovidio et al., 2008; Sorkin et al., 2010). DiMatteo (2007) argued that any negative stereotypes, even in the

absence of conscious prejudice, may contribute to systematic discrimination in care

(DiMatteo, 1997). These beliefs might be based on generalizations from a provider's

clinical experience rather than on evidence-based empirical support (DiMatteo, 1997;

Satel, 2000; Smedley et al., 2002). Researcher have also found that health care providers

select treatments based on their own stereotypical assumptions regarding the patient's

behavior. Some researchers have found that health care providers view African American

patients more negatively than white patients (Dovidio et al., 2008; Finucane & Carrese,

1990; van Ryn & Burke, 2000). These studies have found that physicians stereotypically

view African American patients as less kind, less congenial, less intelligent, less

educated, less likely to adhere to medical advice, more likely to lack social support; and

more likely to have a substance abuse problem compared to White patients (van Ryn &

Burke, 2000).

Provider behavior on clinical decision-making. A patient's race/ethnicity has

been shown to influence a provider's behavior in terms of a physician's interpretation of

a patient's complaint(s) and a physician's clinical decision-making of the medical

problem (e.g., referring patients for particular treatments or procedures) (Gregg et al.,

2010; Horner et al., 2004; Saha, Arbelaez, & Cooper, 2003; Sorkin et al., 2010).

Researchers have found that certain vulnerable populations were less likely than

their counterparts to receive necessary care and preventive care and were more likely to

have higher rates of avoidable outcomes (Asch et al., 2000; Institute of Medicine, 2003b).

Similarly, being a member of a racial/ethnic minority group appeared to be a risk factor

for less intensive, if not lower quality care than not being a member of a racial/ethnic

minority group (Dovidio et al., 2008; Fiscella et al., 2000; Institute of Medicine, 2003b; The Henry J. Kaiser Family Foundation, 2000).

Among Medicare beneficiaries, researchers have found systematic differences in the kind and quality of medical care received (Escarce, Epstein, Colby, & Schwartz, 1993; Fiscella & Holt, 2007; McBean & Gornick, 1994; National Research Council, 2004c). In addition, numerous researchers have found systematic racial/ethnic differences in the receipt of a broad spectrum of therapeutic interventions (Asch et al., 2000; Fiscella et al., 2000; Geiger, 2003; Mayberry, Mili, & Ofili, 2000; National Research Council, 2004c).

Patient's Perceptions and Preferences

Patient's perceptions of his or her health care provider as well as patient's preferences (e.g., patient trust and satisfaction, patient's perceptions of their illness) were factors found to be associated with racial/ethnic minority group disparities in health service usage and compliance with medical care (Hunt, Gaba, & Lavizzo-Mourey, 2005; Scheppers et al., 2006).

Patient's perceptions of the health care provider. Patients act and make decisions based on their perceptions of their health care provider (Sorkin et al., 2010). Patient assessments of health care are associated with service utilization and treatment compliance (Hunt et al., 2005). Researchers have found that perceived quality of care had an impact on relevant medical care outcomes such as compliance to medical advice (Blanchard & Lurie, 2004b; Sorkin et al., 2010) and compliance to treatment (Ciechanowski, Katon, Russo, & Walker, 2001; Sherbourne, Hays, Ordway, DiMatteo, & Kravitz, 1992; Sorkin et al., 2010). A patient's perception of the clinical interaction, such

as perceived discrimination, represented an important mediator of observed racial/ethnic minority group disparities in reports of medical outcomes (Sorkin et al., 2010).

Perceived discrimination. Perceived discrimination was found to be a key factor in racial/ethnic minority group disparities in health outcomes and in compliance (American Psychological Association, 2013; de Castro, Gee, & Takeuchi, 2008; Guyll, Matthews, & Bromberger, 2001; Lauderdale et al., 2006; Meyer, Schwartz, & Frost, 2008; Williams & Mohammed 2009). In addition, perceived discrimination had been shown to influence care-seeking behavior, compliance to medical advice (Dovidio et al., 2008; Lauderdale et al., 2006; Lee, Ayers, & Kronenfeld, 2009; Peek, Wagner, Tang, & Baker, 2011), and quality of care (Lauderdale et al., 2006).

Patient preference. Patient's preferences (e.g., patient trust and satisfaction, patient's perceptions of their illness) was found to play an important role in explaining racial/ethnic minority group disparities in health care use as well as patient's willingness to seek or accept treatment (Hunt et al., 2005; Scheppers et al., 2006), and self-care (Bean, Cundy, & Petrie, 2007).

Patient trust and satisfaction. Patient trust and satisfaction with his or her health care provider has been found to be associated with compliance to treatment and the continuity of care (Ciechanowski et al., 2001; Doescher, Saver, Franks, & Fiscella, 2009; Dovidio et al., 2008; Gross et al., 2003; Sherbourne et al., 1992). Patients with negative stereotypes about their physicians were shown to seek medical care less often when they were sick, were less likely to be satisfied with their medical care, and were less likely to adhere to medical advice by their physicians than those patients who did not have a negative stereotype about their physician (Bogart, Bird, Walt, Delahanty, & Fisher, 2004;

Dovidio et al., 2008). Previous researchers have found that racial/ethnic minority groups have lower levels of trust in their physician and/or hospital when compared to White adults (Dovidio et al., 2008; Hunt et al., 2005). Racial/ethnic minority groups have also expressed lower levels of satisfaction with their health care provider than White adult patients (Dovidio et al., 2008; Haviland et al., 2005; Saha et al., 2003; Sorkin et al., 2010). Haviland and colleagues (2005) found that Asian/Pacific Islander adults gave the lowest ratings on overall satisfaction with medical care than did White adults (Haviland et al., 2005).

Dissatisfaction and subsequent lack of trust may be due to the perception of being discriminated against (e.g., perceived discrimination) that some racial/ethnic minority groups encounter during their clinical interactions with the health care system (Hunt et al., 2005; Kaholokula & Nacapoy, 2010; Sorkin et al., 2010). Among Native Hawaiians, the subsequent lack of trust and suspicion for some services may be one reason in the low utilization rates of health care (Browne et al., 2009; Vogler, Altmann, & Zoucha, 2010).

Patient's perceptions of the illness. Patient's perception of illness, among other factors, were suggested by some researchers as explanatory factors that influenced racial/ethnic minority groups use of health services as well as the adoption of preventive health behaviors (Bean et al., 2007; Kagawa-Singer & Kassim-Lakha, 2003; Scheppers et al., 2006). Cultural factors have been found to shape a patient's perception of his or her illness and influence his or her likelihood of accessing care (Kagawa-Singer & Kassim-Lakha, 2003; Nguyen & Bowman, 2007; Vogler et al., 2010).

Culture is not race nor is it homogeneous or monolithic (Kagawa-Singer & Kassim-Lakha, 2003). The multidimensional and dynamic nature of culture has been

found to impact health practices and health outcomes (Kagawa-Singer & Kassim-Lakha, 2003; Vogler et al., 2010). As such, the cultural constructions of disease, including an individual's beliefs about etiology, have been suggested to be additional factors in the acceptance of treatment and compliance with treatment regimen among racial/ethnic minority adults (Gochman, 1997a).

Researchers have found that racial/ethnic minority adults have alternative constructions of health and disease and the lack of compliance was associated with their understanding of the treatment (Nguyen & Bowman, 2007; Nishita & Browne, 2013; Vogler et al., 2010). In some studies, researchers have found that health care providers were not culturally competent and failed to provide culturally relevant explanations for care (Nguyen & Bowman, 2007; Nishita & Browne, 2013; Vogler et al., 2010). Moreover, cultural and social stigmatization may vary across and within racial/ethnic groups (Kagawa-Singer & Kassim-Lakha, 2003). These factors also contribute to racial/ethnic minority adults decisions to continue treatment (Coreil, 1997; Gochman, 1997a, 1997c). Therefore, the role of a patient's culture was found to be associated with racial/ethnic minority adults' compliance with medical care.

Differences in Provider-Patient Perspective to Compliance

Delamater (2006) argued that the health care provider needs to understand the ways in which patients approach health and the role culture impacts the patient values and beliefs (Delamater, 2006). Most physicians view compliance from the medical model approach in which the physician set the treatment goal(s) and the patient is expected to follow the physician's recommendation(s) and instructions(s) (Stone, Bronkesh, Gerbarg, & Wood, 1998). In this relationship, the physician/patient-family dyad, the provider was

seen as the expert who knows what was best for the patient (Delamater, 2006; Kagawa-Singer & Kassim-Lakha, 2003). However, the medical model approach was ineffective in understanding the why, how, and when patients engage in optimal self-management behaviors (e.g., compliance) (Delamater, 2006).

Compliance and Diabetes Mellitus Type 2

In the area of compliance and diabetes mellitus type 2 research, much of the information on improving compliance among patients diagnosed with diabetes mellitus type 2 was borrowed from other related areas such as hypertension and coronary artery disease (Rhee et al., 2005; Schechter & Walker, 2002). For patients with diabetes mellitus type 2, the medical literature supports the benefits of improved metabolic control (Humphry & Beckham, 1997; Kirkman et al., 2012; Tiara Juarez et al., 2012). The HbA1c test is currently one of the ways to check metabolic control (Medweb, 2012). Compliance in appointment keeping with primary care providers has demonstrated to be a strong predictor of diabetes metabolic control (Schectman et al., 2008). Researchers have found that patients who kept regular appointments for monitoring and care have favorable diabetes outcomes when compared to those who did not have keep their appointments (Karter et al., 2004; Parker et al., 2011; Schechtman, Schorling, & Voss, 2008; Tiara Juarez et al., 2012).

Compliance with Appointments

In 2006, there were over 39 million hospital discharges in the U. S. Nearly 20% of Medicare patients that were discharged from the hospital were readmitted within 30 days of being discharged (Alper, O'Malley, & Greenwald, 2012). While the exact number of

avoidable readmissions was unknown, between 9% and 50% of the readmissions were judged to be preventable (Alper et al., 2012).

A recommendation proposed by the Centers for Medicare and Medicaid Services to reduce avoidable hospital readmissions and to improve use of preventive health services was to have health providers pre-schedule patients with follow-up appointments before patients were discharged from the hospital (Grafft et al., 2010). Researchers that examine compliance with appointment keeping have found a correlation between follow-up arrangements and reduced hospital readmissions in specific target populations (Grafft et al., 2010).

Several researchers have found that providing emergency room patients with outpatient appointments before their discharge significantly improved follow-up compliance with patients keeping their outpatient clinic appointment (Kyriacou, Handel, Stein, & Nelson, 2005; Magnusson, Hedges, Vanko, McCarten, & Moorhead, 1993; Thomas, Burstein, O'Neil, Orav, & Brennon, 1996). Another researcher found that patients compliance with appointment keeping improved when patients had a primary care physician compared with patients who did not have a primary care physician among patients discharged from the emergency room (Kyriacou et al., 2005). Most researchers have found that regardless of whether or not patients have a primary care physician, patients who have their clinic follow-up appointment pre-scheduled at time of discharge have a significantly greater probability of compliance compared with patients given standard discharge instructions (e.g., patient's tasked to schedule his or her own outpatient clinic appointment) (Kyriacou et al., 2005).

The literature in the area of appointment keeping does not explain why patients who have a scheduled outpatient clinic appointment failed to keep them. Parker and colleagues (2011) examined racial/ethnic minority group differences in appointment keeping within a managed care setting and found racial/ethnic disparities among Latinos and African Americans in comparison to White adults in appointment keeping (Parker et al., 2011). However, the study sample did not include Native Hawaiians or part-Hawaiians in since the number of patients belonging to this racial/ethnic group was too small to include (Parker et al., 2011).

Researchers who examined age and compliance have found that patients who miss appointments tend to be younger (Barron, 1980; George & Rubin, 2003; Giunta et al., 2013; Lacy, Paulman, Reuter, & Lovejoy, 2004; Sharp & Hamilton, 2001). According to one researcher, patients who miss their scheduled appointment were generally young adults between the age of 17 to 40 years old (George & Rubin, 2003). Another researcher found the odds of lapse in care among insured patients with diabetes to be 42% higher for young (age, 18-44) than middle aged persons (age, 55-64) (Gregg et al., 2010). These results suggested that the likelihood of missing an outpatient clinic appointment decreased with age (Neal, Hussain-Gambles, Allgar, Lawlor, & Dempsey, 2005).

Findings also indicate that failure to show up for scheduled clinic appointments increased with increasing time between scheduling and actual appointment (Bean & Talaga, 1992; Festinger, Lamb, Marlowe, & Kirby, 2002; Lacy et al., 2004; Moser, 1994; Sharp & Hamilton, 2001) and long waiting times (Bar-dayan, Leiba, Weiss, Carroll, & Benedek, 2002; Bowers, Roland, Campbell, & Mead, 2003; Lacy et al., 2004; Murakami et al., 2011; Ngwenya, van Zyl, & Webb, 2009). In addition, longer waiting times (Bar-

dayan et al., 2002; Bowers et al., 2003; Lacy et al., 2004; Murakami et al., 2011) have been shown to be related to lower satisfaction (Lacy et al., 2004; Rao, Weinberger, & Kroenke, 2000).

Other researchers found patients who missed appointments were due to forgetfulness (Cosgrove, 1990; Lacy et al., 2004; Sharp & Hamilton, 2001), financial issues, transportation issues, feeling that the appointment was unimportant, an inability to get time off from work, feeling too ill, and administrative errors (Bar-dayan et al., 2002; Bowers et al., 2003; Lacy et al., 2004; Murakami et al., 2011). However, the study samples neither focused on older adults 65 years old and over nor grouped them in three distinct age groups (e.g., age group 65 to 74 years old, age group 75 to 84 years old, and age group 85 years and over).

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Disparities in the State of Hawai'i

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Racial/Ethnic Groups

The State of Hawai`i is the nation's second majority-minority state, where non-Hispanic Whites do not form the majority. The state's various racial/ethnic groups are hugely diverse geographically, culturally, and genetically (Executive Office on Aging, 2011; King et al., 2012). According to the 2010 U. S. Census, the major racial/ethnic groups in the state are Asian-Americans (57.4%), White (41.5%), and NHOPI (26.2%). Those who reported some other race were less than 2% of the total state's population (U. S. Census Bureau, 2010c)

Asian-Americans (AA). The State of Hawai`i has the nation's highest proportion of Asians (Department of Business Economic Development & Tourism, 2010). According to the 2010 U. S. Census, the Asian alone-or-in-combination population

represented 57% of the total state's population (U. S. Census Bureau, 2010d). The Asian

alone population represented 38.6% of the total state's population (U. S. Census Bureau,

2010d). Within the Asian alone sub-group, Filipino (197,497 or 14.5% of the state's total

Asian population) were the largest sub-group followed by the Japanese (185,502 or

13.6%), Chinese (54,955 or 4.0%), Korean (24,203 or 1.8%), and Vietnamese (9,779 or

0.07%), respectively (Department of Business Economic Development & Tourism,

2010; U. S. Census Bureau, 2010c).

Native Hawaiian and Other Pacific Islander (NHOPI). According to the 2010

U. S. Census, the NHOPI alone-or-in-combination population represented 26.2% of the

total state's population (Department of Business Economic Development & Tourism,

2010; U. S. Census Bureau, 2010d).

Native Hawaiian (NH). Native Hawaiians are the only indigenous population in

the State of Hawai'i (Grandinetti et al., 1998; King et al., 2012; Mau, 2001). Within the

NHOPI alone sub-group, Native Hawaiians is the largest sub-group (Department of

Business Economic Development & Tourism, 2010; U. S. Census Bureau, 2010b). The

Native Hawaiians alone population represented 24.3% of the total state's population

(Hawai'i State Department of Health, 2009; Ka'opua et al., 2011).

 Older Adult Population

Similar to other states in the U. S., the State of Hawai`i population is aging.

Individuals 65 year or older represented 14.3% of the total state's population in 2010 (U.

S. Census Bureau, 2010b). The most profound increase among older adults in the state

occurred with the 85 and older population (Executive Office on Aging, 2011). Between

2000 and 2010, Hawai'i's 85 and older population had increased 72% while nationally, the same population had increased 29.6% (Executive Office on Aging, 2011).

Disparities in Health Status

Health disparities in the State of Hawai'i are well documented (Brady, 2010; Braun, Mokuau, & Browne, 2010; Ka'opua et al., 2011; Kaholokula & Nacapoy, 2010; Kaholokula et al., 2008; Lee et al., 2010; Mau, 2011; Mau et al., 2010). Efforts to eliminate health disparities have focused on scientific discoveries that eliminate unjust differences in health and health care and promote better health for all individuals (Brady, 2010). The Department of Native Hawaiian Health (DNHH) of the John A. Burns School of Medicine, University of Hawai`i, was created to lead research efforts in addressing the health of Hawai`i's native people (Brady, 2010). In 2007, the DNHH created a Center for Native and Pacific Health Disparities Research at the University of Hawai'i (previously named a Center of Excellence in Partnership, Outreach, Research and Training or Center EXPORT). This center specifically addresses health disparities in Native Hawaiians and other Pacific Islanders (Brady, 2010; Kaholokula et al., 2008).

Racial/ethnic disparities. Although Hawai`i's residents live the longest of all 50 states, they do not all live equally as long or as well (Braun et al., 2010; Department of Business Economic Development & Tourism, 2011). In 2010, the older adult population in Hawai`i had a higher proportion of Asian-Americans and a lower proportion of mixed race persons (two or more races) (Executive Office on Aging, 2011). NHOPIs made up a smaller proportion of older adults then the general population (Executive Office on Aging, 2011).

Age disparities. Life expectancy at birth varies among racial/ethnic groups (Braun et al., 2010; Executive Office on Aging, 2013). The Chinese in Hawai`i have the nation's longest life expectancy (86 years) (Braun et al., 2010; Hawaii Health Information Corporation, 2013) followed by the Japanese in Hawai`i (82 years) (Executive Office on Aging, 2011). Native Hawaiian/part-Hawaiian have the lowest life expectancy of 74 years (Executive Office on Aging, 2011; Hawaii Health Information Corporation, 2013). Compared with Chinese, Native Hawaiians have a life expectancy gap of approximately 11 years and the magnitude of this gap has remained relatively constant since 1950 (Braun et al., 2010).

Sex disparities. In 2005, Hawai`i's average life expectancy was 81years, approximately three years longer than the national average (Executive Office on Aging, 2013; Hawaii Health Information Corporation, 2013). The average life expectancy at birth for males was 78 years and for females was 83 years (Executive Office on Aging, 2013). Females in Hawai`i live almost five-years longer than males (Hawaii Health Information Corporation, 2013).

Disparities in Diabetes Mellitus (DM) Outcomes

Prevalence. Findings from the Hawai'i BRFSS 2005-2007 showed the age-adjusted prevalence rate of diabetes mellitus in the State of Hawai'i was higher than the national prevalence rate (Furubayashi & Look, 2005; Ko, Delafield, Davis, & Mau, 2013; Pobutsky et al., 2010). Among the five largest racial/ethnic minority groups in Hawai`i, diabetes mellitus disproportionately impacts Native Hawaiians and Filipinos adults (Fukunaga, Uehara, & Tom, 2011; Ko et al., 2013; Pobutsky et al., 2010). Findings show Native Hawaiians adults (12.5%) had the highest self-reported age-adjusted prevalence

rate of diabetes when compared with the other major racial/ethnic groups (Pobutsky et al., 2010). Followed by Filipino adults (9.9%), who had the second highest self-reported age-adjusted prevalence rate of diabetes when compared with the other major racial/ethnic groups (Pobutsky et al., 2010).

White adults (4.7%) had the lowest self-reported age adjusted prevalence rate of diabetes when compared with other racial/ethnic groups in the study (Pobutsky et al., 2010). Although the Hawai'i BRFSS methodology has limitations, results are consistent with commercial insurance and Medicaid claims data (Furubayashi & Look, 2005). In addition, Native Hawaiian females have slightly higher diabetes prevalence rate than Native Hawaiian males, and Native Hawaiian females older than age 45 were found to be at the highest risk when compared to Native Hawaiian males of the same age (Mokuau, Hughes, & Tsark, 1995).

Mortality. In 2005, diabetes mellitus was reported to be the seventh leading cause of mortality in the State of Hawai'i (Fukunaga et al., 2011; Furubayashi & Look, 2005; Pobutsky et al., 2010). There was a significant disparity between racial/ethnic groups when a comprehensive assessment of cause of death is examined. The State of Hawai`i Office of Health Status Monitoring (OHSM), 2004-2006 diabetes mortality rates (per 100,000 population) found Native Hawaiian adults to have the highest diabetes mortality rate (either underlying cause of death or contributing cause of death), followed by Filipino adults and Japanese adults (Pobutsky et al., 2010). White adults had the lowest diabetes mortality rate (either underlying cause of death or contributing cause of death) compared to the other racial/ethnic groups (e.g., Chinese, Filipino, Hawaiian, and Japanese). In terms of sex, males had a higher diabetes mortality rate (either underlying

cause of death or contributing cause of death) compared to females (Pobutsky et al., 2010).

The average age of death where diabetes was the underlying cause of death, the OHSM 2004-2006 finding showed a definitive health disparity in premature mortality for two of the six groups for both males and females: 1. Native Hawaiian/part-Hawaiian adults and 2. All Others (which includes Pacific Islanders). Native Hawaiian/part-Hawaiian adults and adults categorized as All Others for both males and females had a much lower average age of death where diabetes was the underlying cause of death compared to White adults, Chinese adults, Filipino adults, and Japanese adults for both males and females (Pobutsky et al., 2010).

Selection of Variables for the Current Study

In summary, diabetes mellitus type 2 is a serious health problem that grows more prevalent with advanced age. In the State of Hawai`i, diabetes mellitus type 2 affects the well-being of many of the state's older adult population. Native Hawaiian adults and Filipino adults are found to be disproportionately impacted by diabetes mellitus compared to White adults (Fukunaga et al., 2011; Ko et al., 2013; Pobutsky et al., 2010). Researchers have found a strong association between compliance in appointment keeping with primary care providers and diabetes metabolic control (Schectman et al., 2008).

The selection of the variables for the current study focused on patient characteristics, such as race/ethnicity, age, sex, and HbA1c. The rationale for including these variables was based on the existing literature which indicated that these variables were important factors when examining compliance in appointment keeping.

Race/Ethnicity

The variable, race/ethnicity, was included in the study for several reasons. First, the literature has extensively reported disparities in the prevalence and burden of diabetes mellitus type 2 are higher for Native Hawaiian and other Pacific Islanders adults when compared to White adults in the State of Hawai`i (Finucane & McMullen, 2008; Fukunaga et al., 2011; King et al., 2012; Ko et al., 2013; Mau et al., 2010; Pobutsky et al., 2010). Second, previous researchers have documented racial/ethnic minority group disparities in access to medical care (Centers for Disease Control and Prevention, 2012; Dovidio et al., 2008; Scheppers et al., 2006; Shi et al., 2009); health insurance coverage (Flores & Vega, 1998; Jenkins et al., 1996; Lipton et al., 1998; Scheppers et al., 2006; Weissman et al., 1991; Wright & Joyner, 1997); psychological factors (e.g., provider prejudice, stereotyping, and discrimination) (Dovidio et al., 2008; Scheppers et al., 2006); and patients' perceptions of their health care provider as well as patients' preferences (e.g., patient trust and satisfaction, patients' perceptions of their illness) which influenced health service usage and compliance with medical care (Hunt et al., 2005; Scheppers et al., 2006).

Third, many earlier studies have documented the association between race/ethnicity minority group disparities and non-attendance, "no-show rates" or missed appointments when compared to White adults (Goldman, Freidin, Cook, & Grich, 1982; Griffin, 1998; Parker et al., 2011; Schectman et al., 2008). Finally, Parker and colleagues (2011) examined racial/ethnic minority group differences in appointment keeping within Kaiser Permanente, Northern California and found disparities among Latino adults and

African American adults in comparison to White adults in appointment keeping (Parker et al., 2011).

Age

The variable age was included for several reasons. First, Hawai`i's residents live the longest of all 50 state; however, they do not all live equally as long or as well (Braun et al., 2010; Department of Business Economic Development & Tourism, 2011). Second, the Hawai`i BRFSS 2005-2007 findings showed the age-adjusted prevalence rate of diabetes mellitus in the State of Hawai`i was higher than the national prevalence rate among older adults (Furubayashi & Look, 2005; Ko et al., 2013; Pobutsky et al., 2010). Third, the literature showed that older adults with low SES were more affected than White adults counterparts in accessing and receiving medical care (Asch et al., 2000; Fiscella et al., 2000; Harris, 2001; Kim et al., 2007; National Research Council, 2004c). Finally, age has been found by previous researchers to be associated with compliance rates (Burgoyne, Acosta, & Yamamoto, 1983; Griffin, 1998; Hertz & Stamps, 1977; Jones et al., 1988).

Sex

The variable sex was included for several reasons. First, diabetes mellitus type 2 prevalence has been shown to vary by this factor (Muller et al., 2013; Sentell et al., 2013). Second, the literature reported sex/gender differences in diabetes management experiences between males and females with diabetes mellitus type 2 (America's Health Rankings, 2011; Mathew, Gucciardi, De Melo, & Barata, 2012; Siddiqui, Khan, & Carline, 2013). Third, studies indicated that males and females have different attitudes

and behaviors related to seeking care and health care use (Dryden et al., 2012; Szymczyk, Wojtyna, Lukas, Kepa, & Pawlikowska, 2013).

HbA1c

The study included the HbA1c test because the test is widely used as an indicator of glycaemic status in the management of diabetes mellitus type 2 (Venkataraman et al., 2012).

Interaction terms. The rationale for including the interaction terms between patients' race/ethnicity and age, and patient's race/ethnicity and sex in the study was due to two reasons. First, Sentell and colleagues (2013) had found disparities among elderly Japanese males in the use of chronic care management practices or approaches (Sentell et al., 2013). Second, the CDC (2001) has reported that racial/ethnic minority older adults, especially females, were impacted by diabetic-related complications associated with the disease (Centers for Disease Control and Prevention, 2001).

It is of particular interest to know if race/ethnicity or age emerged as a significant predictor of compliance in appointment keeping among patients diagnosed with diabetes mellitus type 2, after controlling for sex and HbA1c. Also, if race/ethnicity was moderated by patient's age and sex. To date, the role that race/ethnicity or age phas in determining compliance in appointment keeping with primary care providers is not fully understood. To bridge this research gap, the current study examined compliance in appointment keeping among racial/ethnic older adults diagnosed with diabetes mellitus type 2 within a large HMO in the State of Hawai`i.

3. METHODS

The study was designed to determine if race/ethnicity or age was a significant predictor of patients' compliance with their pre-scheduled outpatient clinic appointments following their hospital discharge after controlling for sex and HbA1c. The study focused on patients enrolled in the Kaiser Permanente, Hawai`i region Senior Advantage health plan. The Kaiser Permanente, Hawai`i region Senior Advantage health plan (or Medicare Part C or Medicare Advantage) included part A, part B, and part D of Medicare.

Research Design

A retrospective cross-sectional research design was chosen to address the research questions. The advantages of using retrospective data include the convenience of collecting the data and the ease of defining the study period.

Study Setting

Kaiser Permanente, Hawai`i region is the state's largest HMO (Kaiser Permanente, 2013a). Kaiser Permanente is a non-profit, prepaid, fully integrated health care delivery health system that provides comprehensive medical services to over 200,000 members (Kaiser Permanente, 2013a). The Moanalua Medical Center on Oahu has a 235-bed acute care in-patient facility. In addition, there are 18 outpatient clinics located on Oahu (e.g., Hawai'i Kai, Honolulu, Kahuku, Kailua, Koolau, Kapolei, Mapunapuna, Moanalua, Nanikeola, and Waipio), Maui (e.g., Kihei, Lahaina, Maui Lanai, and Wailuku), and the Big Island (e.g., Hilo, Kona, South Kona, and Waimea) (Kaiser Permanente, 2013a).

Kaiser Permanente operates a fully integrated and comprehensive computer system, HealthConnect® (Kaiser Permanente, 2013b). HealthConnect® is one of the

most advanced electronic health records system that securely connects each of the medical facilities and coordinates patient care between the physician's office, the hospital, radiology, the laboratory and the pharmacy (Kaiser Permanente, 2013b). In addition, HealthConnect® allows Kaiser Permanente staff to schedule appointments for patients at any of the various Kaiser Permanente facilities (Kaiser Permanente, 2013b).

On the day of patient's being discharged from Kaiser Permanente's Moanalua Medical Center, hospital staff schedule a patient's outpatient clinic appointment through Kaiser Permanente's electronic record system, HealthConnect®. Each patient is presented with a computer printout of his or her discharge instructions. Discharge instructions contain information of the patient's scheduled follow-up appointment (e.g., date and time) with the primary care physician at a Kaiser Permanente outpatient clinic. The follow-up appointment with a primary care physician at a Kaiser Permanente outpatient clinic is usually scheduled within two weeks of the patient's discharge date from the hospital.

Hospital staff reviews the discharge instructions with each patient upon discharge from the hospital. Patients are then released from the hospital with an appointment to follow-up with their outpatient primary care physician. On the date of his or her scheduled appointment, each patient will check-in at the Kaiser Permanente clinic and a clinic staff will record the clinic visit into Kaiser Permanente's HealthConnect® electronic medical records. A patient who fails to keep his or her outpatient clinic appointment is also recorded into Kaiser Permanente's HealthConnect® electronic medical records.

Data Collection Procedures

Secondary data from Kaiser Permanente's HealthConnect® electronic record system was used. Available individual-level data collected included: 1. medical record number, 2. race/ethnicity 3. age, 4. sex, 5. HbA1c test results, 6. name of patient's primary care physician (PCP) (e.g., indicating that a patient had an assigned PCP on the onset of the study), and 7. and Senior Advantage plan. In addition, system-level data was collected: 1. date of hospitalization, 2. date of discharge, and 3. date of HbA1c result.

Inclusion Criteria

Patients whose electronic medical records met the study's inclusion criteria of: (1) age 65 years and older; (2) consecutively enrolled in the Kaiser Permanente Senior Advantage health plan for the years between January 1, 2004 to December 31, 2009; (3) having an HbA1c result within 90-days prior to being discharged from the hospital; (4) having a pre-scheduled follow-up appointment with the outpatient clinic within 30-days of discharge from the hospital; (5) having an assigned primary care physician (PCP); and (6) an ICD-9 code 250* (International Statistical Classifications of Diseases version 9 Clinical Modification) were used.

Exclusion Criteria

Patients whose electronic medical records were excluded from the study included: (1) electronic medical records indicating that the patient discontinued or had a lapse in health plan membership; and/or (2) those electronic medical records with a diagnosis of HIV/AIDS, cancer, or end-stage-renal disease; and/or (3) those electronic medical records with missing data (e.g., no HbA1c test recorded).

In addition, electronic medical records with a readmission date to the hospital equal to or less than 30 days (≤30 days) of the index discharge date and/or duplicate entries due to multiple admissions and discharges.

Medical Records Review

The medical records selection process consisted of four steps. The first step was to select patients' electronic medical records that met the study's inclusion criteria. The second step was to eliminate those electronic medical records that met the exclusion criteria. The third step was to select patients' electronic medical records that had a hospital admission and discharge date. The fourth step was to exclude those electronic medical records that had duplicate entries due to multiple admissions and discharges as well as those electronic medical records that had a readmission to the hospital equal to or less than 30 days (≥30 days) of discharge.

The final sample represented patients' electronic medical records that were unique (e.g., no double entry of electronic medical records due to readmissions after the index hospital discharge date) and had a single index hospital discharge date. Of those electronic medical records identified, the study then evaluated the incidence of patients' compliance with following up with their pre-scheduled outpatient clinic appointment. Figure 3.1 Diagram of process flow provides a diagram of the medical selection process.

Inclusion Criteria
- Identified & Reviewed Computerized Medical Records
- January 1, 2004 to December 31, 2009
- ≥ 65 years
- Continuous Enrollment in Kaiser Permanente, Hawai'i region Senior Advantage plan
- Assigned Primary Care Physician (PCP)
- ICD-9 Code 250*

Computerized Medical Records (Health Connect) N=12,857

Hospital Admission & Discharge n=5,365 (71.6%)

No Readmission to the Hospital (≤30 days) n=3,684 (68.7%)

Included in the Analysis

F/U Clinic Visit (≤30 days) n=3,116 (84.6%)

No F/U Clinic Visit (>30 days) n=568 (15.4%)

Figure 3.1. Diagram of the process flow

Measures

Outcome Measure

The outcome measure of interest was compliance in appointment keeping. Compliance was defined as a patient following up with his or her pre-scheduled outpatient clinic appointment within 30-days (≤30 days) of a patient's index hospital discharge. The index hospital discharge was identified as the patient's first hospital discharge date after a patient was admitted to the hospital. In the event that patient had subsequent readmissions within 30-days (≤30 days) of the initial admission to the hospital, then the discharge dates from these readmissions to the hospital was not considered as a patient's index hospital discharge.

For a patient who followed up with his or her pre-scheduled outpatient clinic appointment, compliance in appointment keeping was operationalized as the difference from the number of days between a patient's index hospital discharge date and the date of the patient's pre-scheduled outpatient clinic appointment. If the difference between a patient's index hospital discharge date and the date of the patient's pre-scheduled outpatient clinic appointment was equal to or less than 30-days ($\leq$30 days), then the patient mets the study's definition of compliance with his or her appointment keeping. If the difference was greater than 30-days (>30 days), then the patient did not meet the study's definition of compliance in appointment keeping. For a patient who missed his or her pre-scheduled outpatient clinic appointment, then he or she also did not meet the study's definition of compliance in appointment keeping. Most studies that examine compliance in appointment keeping or receipt of follow-up care use a restricted time frame that ranged from within 4-6 weeks (Eggleston et al., 2007).

Therefore, the dependent variable "compliance" was a binary dichotomous categorical variable. Coding of compliance was no follow-up = 1 and no follow-up = 0. The reason for this way of coding was that by default, the logistic regression models the probability of the lower level of the outcome variables. In this case, the interest was to model the probability of patients' follow-up with their out-patient clinic appointment in an integrated health care system. Using descending to reverse the coding of the outcome variable models the probability of the presence of the disease.

Predictor Variables

The conceptualization and operationalization of each predictor variables are presented.

Race/ethnicity. The variable race/ethnicity is a nominal categorical variable with seven levels: White (coded as 0), Native Hawaiian/part-Hawaiian (coded as 1), Chinese (coded as 2), Filipino (coded as 3), Japanese (coded as 4), Other Asians (coded as 5), and Other Groups (coded as 6). Patients that identified themselves as one race/ethnicity such as White, Native Hawaiian/part-Hawaiian, Chinese, Filipino, Japanese was categorized accordingly.

Patients who identified themselves as "Other Asians" or 'Other Groups" which were listings in Kaiser Permanente HealthConnect system were categorized as Other Asians and Other Groups, respectively. Patients that identified themselves as Vietnamese, Korean, Asian or Asian in combination with one or more races were treated as a mixed race/ethnicity and were listed as "Other Asians". Patients who identified themselves as other Pacific Islanders or Pacific Islander in combination with one or more races were treated as a mixed race/ethnicity and listed as "Other Groups".

Another category in Kaiser Permanente HealthConnect system was "unknown/decline". Patients not reporting their race/ethnicity or could not be included in one of the aforementioned categories (e.g., Whites, Native Hawaiian/part-Hawaiian, Chinese, Filipino, Japanese, Other Asians, and Other Groups), were treated as missing data. The number of patients in the category of "unknown/decline" or could not be included in one of the listed categories was very small (<20 patients).

Although Asians were considered to be the majority group in the State of Hawai`i, the current study used White as the reference group due to the fact that most of the literature on racial/ethnic disparity, appointment keeping, and diabetes mellitus type 2

used White as the group for comparison (Karter et al., 2006; Karter et al., 2004; Parker et al., 2011; Rhee et al., 2005; Schechtman et al., 2008).

Race/ethnicity was also examined as a dichotomous variable (Native Hawaiian/part-Hawaiian and White), where Native Hawaiian/part-Hawaiian was coded as 0 and White was coded 1. Native Hawaiian/part-Hawaiian was used as the reference group due to the fact that researcher was interested to determine if the observed difference would be greater for Native Hawaiian/part-Hawaiian adults when compared to White adults.

Age. The variable age was a nominal categorical variable with three levels: age group 65 to 74 (coded as 0), age group 75 to 84 (coded as 1), and age group 85 and over (coded as 2). The CDC and the Administration on Aging described the U. S. older adult population based on these three categories (Administration on Aging, 2011). Therefore, the study utilized these three age groups. The reference group was patients in the age group 65 to 74.

Sex. The variable sex was a dichotomous, control variable coded as 0 for female and 1 for male. Females were used as the reference group in the current study.

HbA1c. Another control variable was the glycated hemoglobin (HbA1c) test. The level of HbA1c was proportional to the blood glucose levels and reflected the glycaemic status over the preceding 3 months (the average lifespan of erythrocytes) (Venkataraman et al., 2012). The study included the HbA1c test because the test is widely used as an indicator of glycaemic status in the management of diabetes mellitus type 2 (Venkataraman et al., 2012).

Statistical Analysis

The analysis consisted of four parts. First, descriptive analysis was used to describe patient characteristics. Second, univariate binary logistic regressions was used to examine the relationship between patient's race/ethnicity, age, sex, and HbA1c and patient's follow up with pre-scheduled outpatient appointments. Thirdly, a simultaneous logistic regression model was conducted to test the hypotheses that patients' compliance with pre-scheduled outpatient clinic appointment was a function of patient's race/ethnicity or age, after controlling for sex and HbA1c. Lastly to test the hypotheses that racial/ethnic difference in compliance with pre-scheduled outpatient clinic appointments may depend on either patient's age or sex, one additional model was run. The interaction terms between patients' race/ethnicity and sex, and between race/ethnicity and age, were entered simultaneously with patients' race/ethnicity, age, and sex, after controlling for HbA1c.

The two interaction terms were tested by the likelihood ratio tests and the final model was chosen by considering the simplicity of the model and its overall explanatory capability based on a generalization of R^2 used in classical regression analysis (Negelkerke, 1991). Adjusted odds ratio (ORs) with 95% confidence intervals was calculated for each variable included in the final model. Statistical significance was defined as two-tailed p values of <.05. All statistical analysis was conducted using SAS for Windows version 9.2 software (SAS Institute Inc, Cary NC).

Data Management

All protected health information (PHI) was coded and stored on Kaiser Permanente's computer system. Only the principal investigator (PI) of the study had

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complete access to the PHI. Outside investigators (e.g., PI's doctorate advisor, the doctorial committee, and the Kaiser Permanente statistician) did not have access to any of the PHI.

Any consultation with outside investigators regarding the accuracy of the data, the proper coding of the data, interpretation of the data, or statistical analysis of the data was done after the PI assigned unique identifiers to patients' information. There were 3,684 electronic medical records that met the final criteria; therefore, there were 3,684 unique identifiers generated for each electronic medical record included in the study. In addition to creating unique identifiers for each of the electronic medical records, an index list was generated with a description of the coding system. For example, a patient's age was substituted for the code 0 if he or she is between the ages of 65 to 74.

Ethical Considerations

This retrospective design used secondary data sources. Due to the fact that electronic medical records were used, it did not directly or indirectly harm participants. In addition, it had no anticipated adverse risks during the study, at the termination of the study, and post study period. The study was not a clinical trial and only secondary data was analyzed, there was no financial compensation offered and it was not necessary to do so. Local cultural norms were considered in the development and analysis of the study and were inherent in the theoretical constructs that guided the design and interpretation of the study.

Confidentiality

For the purpose of the analysis, patient identifiers and subject identifiers were coded and randomized to ensure confidentially and that patient data remained protected.

Kaiser Permanente's Institutional Review Board (IRB) had approved the study and the IRB committee had determined that adequate safeguards existed for the privacy, security, and confidentiality of patients' health information.

Informed Consent

The researcher received approval from Kaiser Permanente's IRB committee to waive the need for an informed consent document for the study. The justification for the waiver was based on the aforementioned safeguards and methods that were administered in advance to protect PHI. In addition, the study met two of the HHS regulations (45 CFR46.116(d)): 1. Participation in the research involved no more than minimal risk and 2. the waiver must not adversely affect the rights and welfare of research participants (NIH, 2008).

Protection of Human Subjects

The study was a retrospective study in which PHI was analyzed. For the purpose of the analysis, patient identifiers and subject identifiers were coded and randomized to ensure confidentially of PHI and that patient data remained protected.

4. RESULTS

The purpose of the study was to examine whether or not patient characteristics predicted compliance in appointment keeping in an integrated health care system. The key findings from the study are presented in this chapter.

During the study period, a total of 12,857 electronic medical records from Kaiser Permanente's HealthConnect® system met the study's initial inclusion criteria. Of these electronic medical records, 7,492 (58.3%) were excluded because of incomplete records (e.g., HbA1c test result was not complete). Of the 7,492 remaining electronic medical records, only 5,365 (71.6%) electronic medical records had complete information that met both the inclusion criteria as well as had a hospital date and discharge date.

To prevent double data entry of those 5,365 electronic medical records due to readmissions to the hospital after the index hospital discharge date, 1,681 (31.3%) electronic medical records were excluded from the analysis. The final sample size consisted of 3,684 (68.7% of the n = 5,365) electronic medical records that represented unique patients that were not repeated in the current analysis. This sample size was considered sufficient to provide an overview of patients' compliance patterns (Bagley, White, & Golomb, 2001). According to Bagley and colleagues (2001), the minimum of 25 individuals should be included for each predictor variable for the sample size to be adequate for statistical analysis (Bagley et al., 2001).

Study Sample Characteristics

Table 4.1 summarizes the patient baseline characteristics and compliance. Of the final sample, 3,116 (84.6%) had documentation of patients following up and 568 (15.4%)

had documentation of patients not following up with their pre-scheduled out-patient clinic appointment within 30-days of the index hospital discharge.

Table 4.1

Patient Baseline Characteristics and Compliance

Variables	Frequency (N=3,684)	Percent (%)
Race/Ethnicity		
Whites	1124	30.51%
Native Hawaiian/part-Hawaiian	601	16.31%
Chinese	201	5.46%
Filipino	288	7.82%
Japanese	499	13.55%
Other Asians	771	20.93%
Other Groups	200	5.43%
Age		
Age Group 65 to 74	1659	45.03%
Age Group 75 to 84	1398	38.95%
Age Group 85 & Over	627	17.02%
Sex		
Female	1795	48.72%
Male	1889	51.28%
Compliance		
Followed up	3116	84.54%
No Follow-up	568	15.42%

The largest racial/ethnic group was White adults (n = 1,124), followed by other Asian adults (n = 771), Native Hawaiian/part-Hawaiian adults (n = 601), Japanese adults (n = 499), Filipino adults (n = 288), Chinese (n = 201), and adults in other groups (n = 200). In terms of age, the age group with the largest number of patients was composed of those in age group 65 to 74 years old (n = 1,659), followed by those in age group 75 to 84 years old (n = 1,398), and those in age group 85 years and over (n = 627). Overall, the mean age at the inclusion of the analysis was 76.4 years (SD±7.6). The sample consisted of slightly more males (n = 1,889) than females (n = 1,795).

Results of the Univariate Binary Logistic Regression Analysis

Four univariate binary logistic regression models were run to examine the associations between patients' compliance in appointment keeping and patients' racial/ethnic groups, patients' compliance in appointment keeping and patients' age as defined by age groups, patients' compliance in appointment keeping and sex, and patients' compliance in appointment keeping and HbA1c. Only the model examining the association between patients' compliance in appointment keeping and patients' age was significant (-2 log likelihood=3052.4, x^2=115.04, p<.0001).

No significant associations were found between patients' compliance in appointment keeping and racial/ethnic groups. There was no significant difference observed between Native Hawaiian/part-Hawaiian adults to White adults, or Chinese adults to White adults, or Filipino adults to White adults, or Japanese adults to White adults, or other Asian adults to White adults, or adults in other groups to White adults. Additional contrasts using Native Hawaiian/part-Hawaiian adults as a reference group also revealed no significant difference when comparing Native Hawaiian/part-Hawaiian adults to Chinese adults, or Native Hawaiian/part-Hawaiian adults to Japanese adults, or Native Hawaiian/part-Hawaiian adults to Filipino adults. Further analysis comparing Chinese adults to Japanese adults or Chinese adults to Filipino adults also revealed no significant difference.

Racial/ethnic groups were further examined by reducing it to a two-level variable, where Native Hawaiian/part-Hawaiian (NH/PH) adults were coded 0 and all adults in other groups were coded 1. The univariate binary logistic regression analysis also showed

no significant difference between those two groups (e.g., Native Hawaiian/part-Hawaiian adults to adults in other groups).

Results for Research Questions 1 and 2

Results from the simultaneous logistic regression model are presented in Table 4.2 Simultaneous Logistic Regression Model Testing the Main Effects of Patients' Race/Ethnicity and Age.

Table 4.2

Simultaneous Logistic Regression Model Testing the Main Effects of Patients' Race/Ethnicity and Age

Predictor	Beta-Coefficient	p value	Odds Ratio	95% Wald Confidence Interval	
Intercept	1.2106	<0.0001			
Native Hawaiian/part-Hawaiian	0.0127	0.9272	1.013	0.771	1.331
Chinese	-0.0192	0.9291	0.981	0.643	1.496
Filipino	0.0479	0.7950	1.049	0.731	1.506
Japanese	-0.0508	0.7419	0.950	0.702	1.286
Other Asians	0.1222	0.3633	1.130	0.868	1.471
Other Groups	0.1373	0.5324	1.147	0.745	1.766
Ages 75 to 84	1.1246	<0.0001	3.079	2.462	3.850
Ages 85 & Over	0.6622	<0.0001	1.939	1.483	2.535
Male	0.0173	0.8538	1.017	0.846	1.223
HbA1c Result	0.0182	0.8892	1.018	0.789	1.315

* White is the reference group; for age group, 65 to 74 is the reference group.

For Research Question 1 and Research Question 2, which focused on the main effects of patients' race/ethnicity and age after controlling for sex and HbA1c, the simultaneous logistic regression model was found to be significant in distinguishing between those who followed up with their prescheduled appointments and those who did not follow-up (-2 log likelihood=3050.66, x^2=116.78, p<.0001).

Patients' age remained significant in predicting patients' compliance in appointment keeping. Compared to patients in age group 65 to 74 years old, those in the

age group 75 to 84 years old were 3 times more likely to follow up (OR=3.08, p<0.001). Those in the age group 85 years old and older, this age group was 2 times more likely to follow up than those in age group 65 to 74 years old (OR=1.94, p<0.001).

There was no significant difference observed between Native Hawaiian/part-Hawaiian adults to White adults, or Chinese adults to White adults, or Filipino adults to White adults, Japanese adults to White adults, other Asian adults to White adults, and adults in other groups to White adults.

Result for Research Question 3

The overall model which tested the interactions between patients' race/ethnicity and age, and patients' race/ethnicity and sex was significant (-2 log likelihood=3036.17, x^2=131.27, p<.0001). However, none of the interaction terms were significant. Only patients' age remained significant (p<0.001).

Summary of Findings

Research Question 1 Findings

The first research question proposed that race/ethnicity would be a significant predictor in compliance in appointment keeping after controlling for sex, age, and HbA1c. The study hypothesized that race/ethnicity would emerge as a significant predictor of compliance in appointment keeping and disparities would be observed across races/ethnicities. In addition, the study hypothesized that the observed differences would be greater for Native-Hawaiian/part-Hawaiian adults when compared to White adults. In particular, Native-Hawaiian/part-Hawaiian adults would have lower rates of compliance in appointment keeping when compared to White adults.

However, the univariate binary logistic regression analysis showed no statistically significant relationship between the variables race/ethnicity and compliance in appointment keeping. There was no observable difference in the proportion of patients that followed up versus patients that did not follow-up when comparing each of the other 6 groups to White adults (e.g., Native Hawaiian/part-Hawaiian adults to White adults, or Chinese adults to White adults, or Filipino adults to White adults, or Japanese adults to White adults, or other Asian adults to White adults, or adults in other groups to White adults). In addition, there was no observable difference in the proportion of patients that followed up versus patients that did not follow-up when comparing each of the adults in other groups to Native Hawaiian/part-Hawaiian adults (e.g., Native Hawaiian/part-Hawaiian adults to Chinese adults, or Native Hawaiian/part-Hawaiian adults to Japanese adults, or Native Hawaiian/part-Hawaiian adults to Filipino adults).

Simultaneous logistic regression analysis, adjusting for sex, age, and HbA1c, also showed that race/ethnicity was not statistically significant in predicting compliance in appointment keeping. Findings do not support the hypothesis of race/ethnicity emerging as a significant predictor of compliance in appointment keeping. No observable differences were found across races/ethnicities in compliance in appointment keeping among this study population.

Therefore, findings indicated no racial/ethnic disparities in appointment compliance and suggested that Native-Hawaiian/part-Hawaiian adults were comparable to White adults in their compliance in appointment keeping.

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Research Question 2 Findings

The second research question examined age in three groups as being a significant predictor variable in the model. The study hypothesized that age would emerge as a significant predictor of compliance in appointment keeping.

The univariate binary logistic regression analysis showed a significant association between age in three groups and compliance in appointment keeping. There was an observable difference in the proportion of those that followed up versus those that did not follow-up among each three age categories.

Findings from the simultaneous logistic regression model, adjusting for sex, race/ethnicity, and HbA1c, showed that age remained statistically significant in predicting compliance in appointment keeping. Findings showed that patients in age group 75 to 84 years old and patients in the age group 85 years and older were more likely to follow up when compared to patients in age group 65 to 74 years old.

Therefore, findings supported the hypothesis that age would emerge as a significant predictor in compliance in appointment keeping. Findings indicated that older age groups (e.g., age groups 75 to 84 and ≥85) were more likely to follow up with their outpatient prescheduled appointments compared to those in the younger age group (age group 65 and 74).

Research Question 3 Findings

The third research question examined the extent to which the predictor variable race/ethnicity interacted with age and sex in predicting compliance in appointment keeping among older adults diagnosed with diabetes mellitus type 2 following a hospital discharge. The study hypothesized that race/ethnicity was moderated by patient's age and

sex. The results showed none of the interaction terms to be statistically significant in predicting patient's compliance in appointment keeping. Only patient's age remained significant.

5. DISCUSSION

Disparities in health and health care have been documented in the U. S. (Baquet, Carter-Pokras, & Bengen-Seltzer, 2004; Carter-Pokras & Baquet, 2002b; Ka'opua et al., 2011; Nicklett, 2011; U. S. Department of Health and Human Services, 2000). In the State of Hawai`i, researchers have found that Native Hawaiian adults and other racial/ethnic groups are disproportionately affected by diabetes mellitus type 2 when compared to White adults (Furubayashi & Look, 2005; Grandinetti et al., 1998; Kaholokula et al., 2006; Sentell et al., 2013).

Compliance with a physician ordered medical regimen was a critical factor for patients with diabetes mellitus type 2 (Parker et al., 2011). Researchers have found that patients who kept regular appointments with their primary care providers have favorable diabetes mellitus type 2 outcomes such as better control of their blood sugar and metabolic control (Karter et al., 2004; Parker et al., 2011; Schechtman et al., 2008; Tiara Juarez et al., 2012).

The researcher investigated patient's compliance in appointment keeping among racial/ethnic older adults diagnosed with diabetes mellitus type 2. A positive association was found between age group and compliance in appointment keeping but not between race/ethnicity and compliance in appointment keeping. To the researcher's knowledge, this was the first study that examined compliance in appointment keeping in a racial/ethnic diverse older adult population in a large HMO in the State of Hawai`i.

Interpretation of Findings

Research Question 1

The first research question proposed that race/ethnicity would be a significant predictor in compliance in appointment keeping after controlling for sex, age, and HbA1c. The researcher hypothesized that race/ethnicity would emerge as a significant predictor of compliance in appointment keeping and disparities would be observed across races/ethnicities. In addition, the researcher hypothesized that the observed differences would be greater for Native-Hawaiian/part-Hawaiian adults when compared to White adults. In particular, Native-Hawaiian/part-Hawaiian adults would have lower rates of compliance in appointment keeping when compared to White adults.

Results of the simultaneous logistic regression model that tested hypothesis 1.1 and hypothesis 1.2 did not validate either hypothesis 1.1 or hypothesis 1.2. The researcher did not find race/ethnicity to be associated with patient's compliance in appointment keeping, regardless of Whites or Native Hawaiian/part-Hawaiian being used as the reference group. The researcher's findings differed from previous studies that reported race/ethnicity to be associated with increased likelihood of missing appointments (Lee, Earnest, Chen, & Krishnan, 2005).

Explanation for the findings of research question 1. There were several plausible explanations for the absence of any association between race/ethnicity and compliance in appointment keeping. One explanation may be attributable to the HMO model. Under this model, patients are linked to a primary care physician. This was consistent with the study by Kyriacou and colleagues (2005) that found that patients compliance in appointment keeping improved when patients had an assigned primary

care physician compared with patients who did not have an assigned primary care physician among patients discharged from the emergency room (Kyriacou et al., 2005). Other researchers reported similar findings in that patients who had a regular health care provider were more likely to schedule an appointment and keep an appointment than those patients who did not have a regular health care provider (Hertz & Stamps, 1977; Jones et al., 1988).

In addition to patients having an assigned primary care physician, the researcher's findings suggested that patients appeared to have a positive patient-provider relationship with their primary care physician. Previous researchers have found patient's perceptions of his or her health care provider and provider behavior influenced health service utilization and compliance to medical care (Ciechanowski et al., 2001; Sherbourne et al., 1992; Sorkin et al., 2010). Furthermore, patient's perceptions of perceived discrimination by racial/ethnic minority groups was associated with delay in seeking care (Blanchard & Lurie, 2004a; Dovidio et al., 2008; Spencer & Chen, 2004; Van Houtven et al., 2005), decreased compliance to treatment regimens (Bird, Bogart, & Delahanty, 2004; Blanchard & Lurie, 2004a), and lower rates of follow-up (Blanchard & Lurie, 2004a).

Minority stress theory emphasized the importance of studying the patient-provider interaction to understand the processes that underlie racial/ethnic minority group disparities in health care. The theory posits that the psychological stress (e.g., perceived racism, perceived stigma, or perceived discrimination) experienced by marginalized groups (e.g., racial/ethnic minority groups) over time influenced their interaction with the health care system (Dovidio et al., 2008). A positive patient-provider relationship was argued to moderate the effects of patients preexisting attitudes, beliefs, and social

categorization (e.g., functional cognitive orientation) processes in the medical interaction. Therefore, the positive perceptions of the health care system were reasoned to influence patients compliance behavior and offered a plausible explain to the researcher's findings.

The researcher's finding was important as previous research on Native Hawaiian adults have identified perceived discrimination as influencing their health -seeking behavior and contributed to racial/ethnic minority group disparities in terms of their utilization rates of health care services (Browne et al., 2009; Ka'opua et al., 2011; Vogler et al., 2010). However, the researcher's findings do not negate the perceived impact of discrimination but were suggestive of less pervasive perceptions of perceived discrimination since no significant differences were found between Native Hawaiian/part-Hawaiian adult patients and other racial/ethnic groups in compliance in appointment keeping.

A second explanation may be the result of patients in the study having health insurance coverage. Regardless of patient's race/ethnicity, the study population had Medicare insurance coverage as well as additional health insurance benefits covered by Kaiser Permanente's Senior Advantage plan. Previous researchers found that having health insurance coverage was a determining factor when it cames to seeking care (Flores & Vega, 1998; Jenkins et al., 1996; Lipton et al., 1998; Scheppers et al., 2006; Weissman et al., 1991; Wright & Joyner, 1997). The researcher's finding suggested that having health insurance coverage may have attenuated the effects of race/ethnicity disparities in patients' compliance in appointment keeping since previous researchers have reported that not having health insurance coverage were factors contributing to racial/ethnic

minority group disparities in accessing and receiving medical services (Asch et al., 2000; Fiscella et al., 2000; Harris, 2001; Kim et al., 2007; National Research Council, 2004c).

Research Question 2

The second research question examined age as being a significant predictor variable in the model. The researcher hypothesized that age would emerge as a significant predictor of compliance in appointment keeping. The researcher expected that compliance in appointment keeping would be less likely for patients in age group 75 to 84 years old, followed by patients in age group 85 years old and over because the risks of suffering from diabetes-related co-morbidities and complications would result in detrimental changes to the patients' health status. These changes would decrease the likelihood of patients' compliance in appointment keeping due to the various challenges and barriers that have been associated with compliance in appointment keeping.

Results of the simultaneous logistic regression model validated the hypothesis that age would emerge as a significant predictor in patients' compliance in appointment keeping. Previous researchers that examined patients compliance with appointments found similar results in that age was associated with compliance in appointment keeping (Barron, 1980; Jones et al., 1988; Lacy et al., 2004; Lee et al., 2005; Sharp & Hamilton, 2001). However, one significant distinction of the current study when compared to other studies was that age group was not categorized as ages 65 years and older but separated into three different age groups.

The researcher's results highlighted two important findings of the study. One finding was that those in the age group 75 to 84 years old were 3 times more likely to have compliance in appointment keeping when compared to patients in age group 65 to

74 years old. The second finding was the fact that patients in age group 85 years old and over were 2 times more likely to have compliance in appointment keeping when compared to patients in age group 65 to 74 years old. Therefore, it indicated that researchers should be cautious in grouping the older adult together as one group (e.g., ≥ 65 years old) since the researcher's findings from the current study showed that there were disparities among age groups in their compliance in appointment keeping.

Explanation for the findings of research question 2. There were several possible explanations for the researcher's results. First, differential changes in patient's health status offered a possible explanation to age group disparities found by the researcher. According to the Executive Office on Aging (2006), those older than 60 years of age have reported some type of disability (Executive Office on Aging, 2006). The most common disability reported among older adults was having a physical disability, followed by going outside of the home, sensory, cognitive, and self-care issues (Executive Office on Aging, 2006).

For those older adults diagnosed with diabetes mellitus type 2, impaired cognition (California Healthcare Foundation, 2003; Christman et al., 2011; Crowe et al., 2010; Munshi et al., 2006; Rosen et al., 2003; Samaras, 2012; Wandell & Tovi, 2000; Yeung, Fischer, & Dixon, 2009), physical/functional disability and mobility limitations (Andrade, 2010; Chiu & Wray, 2010; Finucane & McMullen, 2008; Myers, 2009; Sinclair, Conroy, & Bayer, 2008; Wandell & Tovi, 2000; Wong et al., 2013), and depression (Braginsky, Inouye, Wang, & Arakaki, 2011; California Healthcare Foundation, 2003; De Coster & Cummings, 2005; Fukunaga et al., 2011; Gavard, Lustman, & Clouse, 1993; Grandinetti et al., 2000; Ko et al., 2013; Munshi et al., 2006;

National Academy on an Aging Society, 2011; Peyrot & Rubin, 1997; Wandell & Tovi, 2000) have been demonstrated to impact patient's activities of daily living (Andrade, 2010; Chiu & Wray, 2010; Marrocco, Dwyer, Bermudez, & Ouyang, 2001; Sinclair et al., 2008) and his or her health-related quality of life (California Healthcare Foundation, 2003; Ribu, Hanestad, Moum, Birkeland, & Rustoen, 2007; Rubin & Peyrot, 1999; Wandell & Tovi, 2000).

Researchers have found that the likelihood of suffering from diabetes-related co-morbidities and complications increased with age (Anderson & Brownson, 2000; California Healthcare Foundation, 2003; Chiu & Wray, 2010; Crandall et al., 2008; Sinclair et al., 2008) and the duration of the disease were important factors for self-assessed general health and physical functioning (Chiu & Wray, 2010; Wandell & Tovi, 2000). As such, the impact of the health related changes in health status may differ by age groups and affect compliance in appointment keeping.

Second, researchers have reported that transportation issues were factors in patient's compliance in appointment keeping (Bar-dayan et al., 2002; Bell et al., 2005; Bowers et al., 2003; Cosgrove, 1990; Finucane & McMullen, 2008; Griffin, 1998; Lacy et al., 2004; Martin, Williams, Haskard, & DiMatteo, 2005; Murakami et al., 2011; Ngwenya et al., 2009; Scheppers et al., 2006; Shi et al., 2009). The lack of transportation has been reported to affect patients participation in appropriate diabetes care by making it challenging for them to reach clinics (Gary et al., 2008). Transportation has been documented to be a vital component provided by family or friends. In the State of Hawai`i, a large majority (85%) of family (informal) caregivers have been shown to

assist the older adult by providing rides to his or her appointment (Executive Office on Aging, 2006).

In addition, the disparities observed by age groups may reflect the differing contributions of a patient's personal and social resources. As suggested by the life-course explanation, personal and social resources have been associated with protective effects (Geertsen, 1997; Mendes de Leon & Glass, 2004). Prospective studies have found that social relationships as well as social involvement procure protective effects for the older adult (Berkman, Glass, Brissette, & Seeman, 2000; Harvey & Alexander, 2012; House et al., 1988; Jylha & Aro, 1989; Mendes de Leon & Glass, 2004; Shye, Mullooly, Freeborn, & Pope, 1995; Steinbach, 1992). For the older adult, the protective effects of a patient's social and personal resources may be different for each age group.

The influence of a patient's social support has been associated with greater patient compliance (Bertera, 2003; De Coster & Cummings, 2005; Kirscht, Kirscht, & Rosenstock, 1981; Kirscht & Rosenstock, 1979; Nicklett, 2011; Peek, Cargill, & Huang, 2007; Rosenstock, 1985) as well as providing a buffering effect on the adverse impact of stress related to diabetes management (Delamater, 2006; Griffith, Field, & Lustman, 1990; Misra & Lager, 2007; Trief et al., 2003). Family support has been shown to play a significant role in the management of chronic diseases and in the general daily care of the frail older adult (Bertera, 2003; Browne & Braun, 2001; Mitzner, Chen, Kemp, & Rogers, 2011; Stone, 1991; Stone, Cafferata, & Sangl, 1987; Stone & Keigher, 1994). Researchers have documented that family caregivers provided the majority of care to the older adult when he or she became progressively disabled and needed increased amounts of care (Browne & Braun, 2001; Stone et al., 1987).

In the State of Hawai`i, many older adults reside in multigenerational living arrangements (7.2% of households) and the average household size comprise of 2.96 persons (Executive Office on Aging, 2013). The protective effects of a patient's social and personal resources in terms of intergenerational exchanges may influence compliance in appointment keeping among the age group 85 years old and over. For example, intergenerational exchange occurs when a family member moves in with the older adult and lives rent free in return the family member provides non-paid custodial care (e.g., meal preparation, medication management, monitoring of hypoglycemia, etc.) to the older adult. In another example the older adult moves in with a family member and the older adult contributes by using his or her income to pay the rent, mortgage, or household expenses in return for family assistance in activities of daily living and instruments of activities of daily living.

In contrast, the protective effects of a patient's social and personal resources in terms of spousal support may influence compliance in appointment keeping among the age group 75 to 84 years old. Spousal influence has been associated in patient's decision making relating to health behavior outcomes (Trief et al., 2003; Zink, 1996). A study by Jones and colleagues (1988) found that older patients who were married were more likely than patients who were single to exhibit higher compliance rates in keeping their appointment (Jones et al., 1988). In the State of Hawai`i almost two-thirds (62.0%) of older adults are married (versus widowed 23.6% or divorced 8.4% or never married 6.1%) (Yuan, Karel, & Yuen, 2007). A study by Silliman and colleagues (1996) found that among diabetic patients age 70 years and older, more than half of family members that participated in the patient's diabetic's care were spouses (Silliman, Bhatti, Kahn,

Dukes, & Sullivan, 1996). Therefore, the contribution of spousal support in compliance in appointment keeping may provide insight into explaining the study's finding in the age group 75 to 84 years and older.

Among the age group 65 to 74 years old, in comparison to the previous two age groups, the protective effects of a patient's social and personal resources in terms of intrinsic rewards through the engagement in social activities and the fulfillment in meaningful work and may play a role in compliance in appointment keeping. According to the Executive Office on Aging (2013), older adults in the State of Hawai`i report engaging in more leisure or exercise time compared to older adults nationally (Executive Office on Aging, 2013). In addition, the State of Hawai`i had a higher percentage of older workers (31.8%) still in the workforce compared to the nation (27%) (Executive Office on Aging, 2013). A survey by the AARP reported that older adults in the State of Hawai`i did not indicate "needing or wanting the extra income" to be a major factor in the decision to work (AARP, 2011). AARP survey participants responded that the major factor which influenced their decision to work beyond the traditional retirement age of 65 was "enjoying the job or enjoying work" (AARP, 2011).

The protective effects of intrinsic rewards through the engagement in social activities and the fulfillment in meaningful work may also invoke adaptive and psychological mechanisms to compensate for physiological limitations attributable to having diabetes mellitus type 2. Therefore, patients' perceptions of their sense of well-being and their self-assessed quality of life after being hospitalized may contribute to patients' beliefs and attitudes towards compliance in appointment keeping. Previous researchers have indicated that patients' compliance in appointment keeping was

attributable to patients' feeling better and the visit to the clinic was unnecessary (Barron, 1980; Bigby, Pappius, F., & Goldman, 1984; Cosgrove, 1990; Dryden et al., 2012; Frankel, Farrow, & West, 1989; Griffin, 1998; Jones, Cronin, & Bowen, 1993; Lacy et al., 2004; Nielsen, Dyhr, Lauritzen, & Malterud, 2004; Norman & Fitter, 1989; Wall & Teeland, 2004). In addition, Griffin (1998) who reviewed the literature on patients defaulting (e.g., non-attendance) from diabetes clinic appointments, found that nearly a third of patients with non-insulin-dependent diabetes felt that they were not ill enough to require hospital follow-up (Griffin, 1998).

Third, patients' health beliefs based on the theoretical framework of the HBM offer possible explanations to age group disparities found in the study. Components of the health belief model (HBM) have been identified as significant predictors of compliance with treatment regimens. Following the rationale of the HBM, patient's perceived susceptibility and patient's perceived severity of the event may motivate an individual to comply with treatment. Previous researchers found compliance to be positively associated with perception of susceptibility to illness (Becker et al., 1972; Gordis et al., 1969; Macrae, 1984), perceived seriousness (Gordis et al., 1969; Harris & Linn, 1985; Kirscht et al., 1976; Macrae, 1984), and the perception that the recommendation would reduce the illness threat (e.g., costs minus benefits of action) (Fincham & Wertheimer, 1985).

The perceived severity and perceived susceptibility of the disease may be interpreted differently as a function of his or her age category. For example, patients' age 75 to 84 years old may be strongly motivated to follow-up with their pre-scheduled out-patient clinic appointment because they perceive their illness to be life-threatening due to

their recent admission to the hospital. In comparison, patients' age 65 to 75 years old that may be relatively healthy, have fewer diabetes- related co-morbidities, and may not perceive themselves to either susceptible of getting sick again or believe the severity of the illness to be life-threatening for them to be readmitted to the hospital. However, further exploration into this is needed as it highlighted the fact that patient's health belief on compliance in appointment keeping was different for each age group.

Research Question 3

The third research question examined the extent to which the predictor variable race/ethnicity interacted with age and sex in predicting compliance in appointment keeping among older adults diagnosed with diabetes mellitus type 2 following a hospital discharge. The study hypothesized that race/ethnicity was moderated by patient's age and sex.

Although the researcher did not find either race/ethnicity or sex to be associated with compliance in appointment keeping in each of the univariate analysis, both these variables were included in testing for interaction effects as previous researchers have found these terms to be statistically significant (Centers for Disease Control and Prevention, 2001; Sentell et al., 2013).

Results of the additional model which simultaneously entered the interaction terms (e.g., between patients' race/ethnicity and sex and between race/ethnicity and age) with patients race/ethnicity, age, and sex, after controlling for HbA1c did not validate the hypothesis. The researcher's results found no interaction between patients race/ethnicity and age and patients race/ethnicity and sex.

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Explanation for the findings of research question 3. This may be due to the fact that that the study population was similar in terms of their insurance status and access to health care setting.

Implications for Social Policy

The researcher's findings provided important implications for social policy. The theoretical works discussed previously suggested that the integration of concepts from the life-course explanation, minority stress theory, and the health belief model can aid to educate professionals and policy makers in the design of health care models similar to HMOs and developing new approaches and practices that are based on a comprehensive health care model such as the patient-centered health care system orientation.

HMO Model

The most important implication was demonstrated by the absence of racial/ethnic disparities outcome. Plausible explanations may be attributable to two factors: the HMO model and Kaiser Permanente's approach to health care delivery. First, the HMO model was argued to provide a system-level focus on standardization of care that limits physician discrimination on non-clinical patient characteristics when clinical decisions conflict with quality-of-care guidelines (Adams et al., 2005). Previous researchers that examined the relationship between physician perceptions and treatment disparities found that patients race/ethnicity influenced physician behavior in terms of physicians interpretation of patients' complaints and ultimately clinical decision-making (e.g., referring patients for particular treatments or procedures) (Gregg et al., 2010; Horner et al., 2004; Saha et al., 2003; Sorkin et al., 2010).

In addition, the HMO model was argued to be a system for addressing disparities in access to health care and in the quality of care for racial/ethnic populations (Fiscella & Franks, 2005). Reports from the Institutes of Medicine (IOM)s, Envisioning the National Healthcare Quality Report (Institute of Medicine, 2001b) and Guidance for the National Healthcare Disparities Report (Institute of Medicine, 2002), have documented the existence of disparities that racial/ethnic minority groups encounter even when they do have access to care (Agency for Healthcare Research and Quality, 2012). Moreover, researchers have found mixed findings regarding the impact of HMOs on racial/ethnic minority disparities in health care (Fiscella & Franks, 2005; Haas, Phillips, Sonneborn, MCulloch, & Su-Ying, 2002; Hunt et al., 2005; O'Connell & Brown, 2003; Schneider, Cleary, Zaslavsky, & Epstein, 2001; Stevens & Shi, 2002). Although the current study did not compare HMO members with those not belonging to an HMO, the researcher's findings suggested that the HMO model in the State of Hawai`i may be effective in addressing racial/ethnic disparities in compliance.

Kaiser Permanente Approaches and Practices

Second, Kaiser Permanente Hawai'i region approach to care delivery was based on a patient-centered health care system orientation. A patient-centered health care system orientation, derived from the definition of patient-centered care, was argued to improve care processes and health outcomes through patient-provider relationship (interpersonal dimension), the provision of care (clinical dimension), and system features (structural dimension) (Greene, Tuzzio, & Cherkin, 2012; Jayadevappa & Chhatre, 2011).

The Institute of Medicine (IOM) defined patient-centered care as an approach to providing care that was respectful of and responsive to the individual patient preferences, needs, and values and ensured that patient values guided all clinical decisions (Institute of Medicine, 2001a). This patient-centric focus was reasoned to be effective due to the fact that the patient's care revolved around the patient's issues and was based on his or her ethical and cultural values that allowed a patient to make informed decisions regarding his or her health care (Buffington, 2007; Jayadevappa & Chhatre, 2011; Scherger, 2009). The physician facilitated the process of informed decision-making and tailored the patient's treatment(s) based on the needs, preferences, and values of the patient (Buffington, 2007; Jayadevappa & Chhatre, 2011; Scherger, 2009).

Therefore, the medical interaction between the patient and the physician was characterized as a collaborative effort in which an agreement would be reached (e.g., shared decision-making) with regard to the role of the patient-provider relationship and the goals of treatment (Dovidio et al., 2008; Greene et al., 2012; Inzucchi et al., 2012; Jayadevappa & Chhatre, 2011). Studies have shown that by practicing patient-centered care, facilities experience improvement in patient's health outcomes, quality of care, increased efficiency of care (Barry, Hickner, Ebell, & Ettenhofer, 2001; Bauchner, Adams, & Burstin, 2002; Bechel, Myers, & Smith, 2000; Beck et al., 1997; Davis & Stremikis, 2010; Greene et al., 2012; Greenfield, Kaplan, Ware, Yano, & Frank, 1988; Jayadevappa & Chhatre, 2011; Murray & Berwick, 2003; Stewart et al., 2006; Trento et al., 2001; Wagner et al., 2001; Weinger, 2003).

Kaiser Permanente's patient-centered health care system orientation incorporated an integrated care framework (McCulloch, 2013; Porter & Kellogg, 2008). Integrated

care has been increasingly recognized as a critical adjunct to health care deliver and patient management (Kodner, 2002). It can be defined as a concept of bringing together of inputs, delivery, management and organization of services....as a means of improving access, quality, user satisfaction, and efficiency (Grone & Garcia-Barbero, 2001; Kodner, 2002).

In this framework, Kaiser Permanente's integrated delivery system coordinates care activities in and around patient focused approached activities (Luft, 2010; McCulloch, 2013; Porter & Kellogg, 2008). It shifts the priority from acute, disease-focused episodic care to person-centered, coordinated care across multiple settings and across an entire continuum (Golden, 2011). Kaiser Permanente's clinical care pathways and HealthConnect® were tools that facilitated and supported the integrated care framework. In the clinical care pathways, roles and accountabilities were clarified and protocols for the care delivery were defined (Porter & Kellogg, 2008). The pathway outlines the best practices for the order and timing of interventions. It also indicated when patients need to access care from the various team members, given their disease progression. HealthConnect® was a tool that facilitated the coordination of care and enhanced the communication process by integrating information technology with care management among the team (Porter & Kellogg, 2008). Therefore, it made care delivery convenient for patients and increased communication among all the providers providing care.

The researcher's findings provided evidence that a patient-centered health care system orientation that was based on an integrated care framework which focused on patient preferences, encouraged patient involvement, and tailored to the patient's needs may be effective in addressing racial/ethnic disparities (Dovidio et al., 2008; Greene et al., 2012; Inzucchi et al., 2012) and thus influenced compliance in appointment keeping.

It also suggested that Kaiser Permanente's care delivery system was a successful approach in addressing racial/ethnic disparities in compliance in appointment keeping.

Internal Policy Actions and Recommendations

The researcher's findings have important implications for internal policy actions that could be implemented to increase compliance of older adult diabetic patients. Two policy recommendations were suggested to help better understand patients' compliance in appointment keeping and provide opportunities to improve patients' compliance in their outpatient clinic appointment.

Recommendation 1. The first recommendation was to further investigate the reason(s) as to why patients comply with their pre-scheduled out-patient clinic appointment. The researcher found that the majority of patients were compliant in appointment keeping; however, the researcher did not find out why patients were compliant (or non-compliant). The HBM suggested that patients compliance with their appointment was because patients believe they were susceptible to being sick and that they perceived the illness to be serious enough that they would change their actions by following up with their appointment. In addition, the benefits of having their appointment being pre-scheduled means that patients do not have expend their time and energy in making their follow-up appointment. Intuitively, the HBM makes logical sense; however, questions persist as to why there are those patients who fail to comply with following up with their appointment.

Qualitative research methods may be a suitable and even preferred method for investigating this issue at a deeper level. As an example, focus groups lead by a social worker or other health care professional could help to tease out and better understand the

reason(s) as to why patients either comply or do not comply with their pre-scheduled out-patient clinic appointment. As the researcher found, there remains opportunity to target patients who fail to follow-up with their pre-scheduled out-patient clinic appointment. Cultural factors, behavioral and attitudinal attributes, as well as logistical limitations, may be variables that contribute to the discrepancy. Responses from patients participating in the focus groups would potentially bring to the forefront the issues and challenges that patients' encounter. The current intervention of pre-scheduling patients' outpatient clinic appointment may provide a partial solution to the problem. However, there may be deeper underlying issues that could provide richer insight into the problem and provide opportunities to structure specific intervention strategies to improve compliance in appointment keeping.

Potential limitations to focus groups would be the time needed to arrange the focus groups; training the social worker(s) on how to lead the focus groups; and the financial resources needed to make it happen. Similar to the reasons as to why patients failed to show up for their pre-scheduled outpatient clinic appointments, the organization needs to make a commitment to overcome potential barriers in order for these patients to attend focus group meetings. For example, patients who cannot drive and/or require caregiver assistance to get to the focus group meetings, then financial assistance may be needed to pay for services in order of them to attend the meetings. In addition, the focus group leader should be trained to lead group discussions and have the skill to moderate these discussions. The organization has to be committed to allocate resources and invest human capital to ensure that the focus groups are effective and productive.

Recommendation 2. A second recommendation was to have advance care planning for patients who do not follow-up with their appointment. Advance care planning is a process that aims to help patients establish decisions about their future care (Sabatino, 2010). It encompasses not only the legal documents (e.g., Durable Power-of-Attorney for Health Care, Living Will, etc.) but also captures the essence of patient-centered care and the quality of communication among the patient, family, and health care providers (Sabatino, 2010). The key elements of advance care planning includes patient's understanding of his or her overall medical condition and prognosis for both the short-term and long-term; his or her understanding of treatment plan options and the impact it would have on the patient; and the development of general goals for treatment by both the patient and the physician (Gillick, 1995). Legislation on advance care planning has been supported in the U. S. (Sabatino, 2010).

Advance care planning conversations can address and target patient-perceived barriers in his or her compliance in appointment keeping. As the minority stress theory and the life course explanation suggested, lifelong exposure to psychological stressors may contribute to patients' attitudes and engagement in health care. In addition, historical experiences including immigration, acculturation, enslavement, internment, discrimination, and cultural devastation influence help-seeking patterns (Braun & Browne, 1998; Shrinivasan & Guillermo, 2000; Yamashiro & Matsuoka, 1997). Therefore, patient-centered advance care planning would further enrich the patient-physician relationship (e.g., ameliorate perceived discrimination, engender trust, etc.) by potentially helping racial/ethnic older adults overcome negative attitudes of the health

care system as a result of differential lifelong exposure to psychological stressors with the health care system.

Advance care planning adopts a communication-based approach that emphasizes health care providers having meaningful conversations with patients and/or families about living with a serious illness and it evolves in the context of a strong patient-provider relationship (Smith et al., 2006). Researchers have found that patient-provider communication and interaction significantly affect patients' decisions about their health practices and their behaviors (Bean et al., 2007). For the older adult patient, quality of life was an important consideration when setting and prioritizing treatment goals (California Healthcare Foundation, 2003). Integrating advance care planning into practice with the patient as well as his or family is important since racial/ethnic older adults may have undiagnosed cognitive impairments (e.g., dementia) or fail to share with the provider that English is not his or her primary language.

In addition, diabetic guidelines may not be feasible or viable for the older adult patients whose life expectancy may be shorter than the time needed to benefit from an intervention or aggressive management can result in harm and negative side effects (e.g., episodes of hypoglycemia with tight blood sugar control or hypotension with aggressive blood pressure control). Therefore, the treatment goals need to be continually discussed with the patient, his or her power-of-attorney for health care, and/or other parties involved in the care of the racial/ethnic older adult.

The researcher's results found different age groups may prompt different strategies to engage patients in compliance in appointment keeping. Advance care

planning may provide the framework for tailoring age group appropriate interventions designed to help racial/ethnic older adults engage in the health care system.

Implications for Social Work Practice

The researcher's findings have important implication for social work practice. First, the growing aging population and the increasing prevalence rates of diabetes type 2 signified the importance of addressing disparities in diabetes outcomes. Compliance in appointment keeping, or lack thereof, has demonstrated to be a potentially useful indicator for identifying patients at risk for non-compliance.

Second, disparities found among the various age groups implied that differing personal and social resources (e.g., finances, transportation, and social support) influence patients' ability to access health care services. It also implied that differing life experiences and health beliefs were possible contributing factors in the older adults engagement with the health care system and in their motivation to change (e.g., obtaining preventive care for managing their diabetes mellitus type 2, compliance with treatment).

Third, a comprehensive psychosocial assessment of the older adult needs to include questions on compliance. It should also assess for risk factors which impede the older adults' activation and engagement with the health care system. Once identified, then intervention strategies can be tailored to meet the needs of the older adult. For example, the younger older adult (age group 65 to 74 years old) may need more education on prevention to stay healthy versus the middle age group (age group 75 to 84) or the oldest old group (age group 85 years and older). Among the middle age group, they may only require encouragement for their continued compliance in follow-up versus the other two age groups. Among the oldest old group, social workers may need to further

assess for reasons why this age group was found to have a decrease in compliance compared to the middle group.

Finally, the majority of the older adults in the study were compliant in their appointment and no racial/ethnic disparities were found in compliance. It highlighted the fact that there may be other reasons as to why racial/ethnic minority groups have worse health outcomes compared to White adults. For example, Native Hawaiian/part-Hawaiian adults have the highest prevalence rates of diabetes mellitus compared to White adults. However, the researcher's finding indicated that the high prevalence rate was not attributable to this group not being compliant in appointment keeping.

Study Limitations

The first limitation of the current study was that the study failed to include socio-economic status (SES) variables such as income, assets, or education level—data not available in Kaiser's computerized medical record system. Previous studies have documented the potential influence of the socioeconomic status in understanding health disparities in compliance in treatment (Adler et al., 1994; Adler et al., 1993; Marmont et al., 1987; Marmont et al., 1997; Meyers, 2007; National Research Council, 2004b; S. Preston & P. Taubman, 1994; Williams, 1990; Winkleby & Cubbin, 2004). The study recognized the importance of controlling for these influences; however, the information was not readily available and it was beyond the scope of the study. Future prospective studies (e.g., surveys, questionnaires, etc.) could gather information on patients' personal and social resources (e.g., having an informal or formal caregiver, friends and family, etc.) and examine the relationship of the role of personal and social resources have on the

older diabetic patient and compliance in their pre-scheduled out-patient clinic appointment within Kaiser Permanente health care system

To correct for this limitation, patients' insurance status served as a proxy for SES, albeit an incomplete one. All patients included in the study received Medicare benefits and had to be enrolled in the Kaiser Permanente, Hawai'i region Senior Advantage plan. The study assumed patients were literate since they had to have an employment history in order to receive Medicare benefits.

The second limitation of the current study was the fact that age associated cognitive abilities and different degrees of cognitive decline were not analyzed. The association between advanced age and cognitive decline is well documented (Hanninen et al., 1996; Von Dras & Blumenthal, 1992). Studies found both older age and diabetes mellitus were independently associated with increased risk of cognitive dysfunction; the risk was even greater for older adults with diabetes mellitus type 2 (Crooks, Buckwalter, & Petitti, 2003; Hassing et al., 2004; Kirkman et al., 2012; Messier, 2005; Munshi et al., 2006; Ryan, 2005; Yaffe et al., 2004). In addition, studies have shown an increased risk of cognitive impairment and function, manifested as decreased memory, learning, or verbal skills (California Healthcare Foundation, 2003; Christman et al., 2011; Crowe et al., 2010; Gregg et al., 2000; Munshi et al., 2006; Rosen et al., 2003; Samaras, 2012; Wandell & Tovi, 2000; Yeung et al., 2009).

Other studies have found that cognitive dysfunction, especially executive dysfunction, can affect insight into one's behavior and may contribute to older adult patient's not reporting either cognitive problems or minimizing the difficulty in managing his or her diabetes (Abbatecola et al., 2004; Gold, Deary, & Frier, 1993; Grande,

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Miliberg, Rodolph, Gaziano, & McGlinchey, 2005; Kuo et al., 2005; McKhann et al., 201; Munshi et al., 2006; Seltzer, Vasterling, Mathias, & Brennan, 2001). Although information on cognitive status was not formally assessed or available in the current data set, the inclusion of cognitive impairment criteria in the predictive model could be a useful co-morbidity marker to identify older adult patients at risk for compliance in appointment keeping.

The third limitation of the study was the fact that functional impairment and duration of diabetes mellitus type 2 were not analyzed. Aging and diabetes mellitus type 2 are both risk factors for functional impairment (Kirkman et al., 2012; Spollett, 2006). Previous studies that have examined the risk of disability associated with having diabetes mellitus type 2, have found that older adults diagnosed with diabetes mellitus type 2 were about 1.5 times more likely to have physical limitations and alterations in their activities of daily living when compared to older adults without diabetes mellitus (Bertoni, Krop, Anderson, & Brancati, 2002; Spollett, 2006). A number of studies have found diabetic related co-morbidities were associated with a loss of autonomy and was strongly correlated with physical limitations and functional disability (Andrade, 2010; Belanger, Martel, Berthelot, & Wilkins, 2002; Franco, Steyerberg, Hu, Mackenbach, & Nusselder, 2007; Graham et al., 2007; Jagger, Goyder, Clarke, Brouard, & Arthur, 2003; Laditka & Laditka, 2006; Otiniano, Du, Ottenbacher, & Markides, 2003; Stevens et al., 2008; Wong et al., 2013).

Other studies have suggested that the duration of diabetes was related to functional limitations (Chiu & Wray, 2010; Kirkman et al., 2012; Park et al., 2006; Spollett, 2006; Wong et al., 2013; Wu et al., 2003). Diabetic patients with a longer

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duration of the disease were more likely to report functional limitations than those with shorter duration of the disease (Park et al., 2006; Wu et al., 2003). The cumulative effects of diabetes related complications and a longer duration of diabetes mellitus type 2 has been shown to have an adverse impact on measures of activities of daily living and instruments of activities of daily living among older adult patients (Andrade, 2010; Chiu & Wray, 2010; Munshi et al., 2006; Spollett, 2006; Wandell & Tovi, 2000; Wu et al., 2003). However, the data was not available in the computer system.

The fourth limitation of the study was the fact logistical variables and neighborhood characteristics were not analyzed. Some studies have indicated that logistical issues (e.g., transportation, distance and location of where the health care facility was situated, site-specific structural features), were potential factors in predicting patients' use of health services and keeping appointments (Parker et al., 2011; Scheppers et al., 2006). Other studies indicated neighborhood characteristics may influence rates of participation in health behaviors that are necessary for appropriate diabetes care (Gary et al., 2008). Poor neighborhoods may present barriers such as crime and lack of access to public transportation that could affect patients' ability to reach clinics and pharmacies (Gary et al., 2008; Scheppers et al., 2006). In some studies, perceived neighborhood problems were associated with more physical inactivity, higher perceptions of stress, and an increased risk of functional loss among older adults (Balfour & Kaplan, 2002; Gary et al., 2008; Morbidity and Mortality Weekly Report, 2005; Schieman & Meersman, 2004).

The fifth limitation of the study was the fact that psychological factors such as patients' health beliefs were not analyzed. Patient's health beliefs, such as perceived seriousness of diabetes mellitus type 2, vulnerability to complications, and the efficacy of

treatment were linked to compliance in treatment regimen and to engage in healthcare services (Bean et al., 2007; Brownlee-Duffeck et al., 1987; Delamater, 2006; Dryden et al., 2012; Hsu & Gallinagh, 2001; Shiloh et al., 1997; Simpson, Johnston, & McEwen, 1997). Studies found fear to be a factor in compliance in appointment keeping (Dryden et al., 2012; Frankel et al., 1989; Lacy et al., 2004). In addition to fear, other studies have found emotional barriers such as denial and depression linked to compliance to diabetes management (Dryden et al., 2012; Fukunaga et al., 2011; Gavard et al., 1993; Wandell & Tovi, 2000). The current study suggested that psychological factors may contribute to disparities in compliance in appointment keeping and perceptions for one age group may be different from those of another age group; however, it was not formally analyzed.

Logistical, neighborhood, and psychological factors exert separate effects on compliance and these effects were beyond the current study's control. The intent of the current study was to analyze existing data obtained from Kaiser Permanente, Hawai'i region computer medical record system, to determine whether or not racial/ethnic or age group disparities exist among older adult diabetic patients in their following up with their pre-scheduled out-patient clinic appointment. More importantly, whether or not racial/ethnic or age group were predictors in compliance in appointment keeping. Therefore, the objectives of the study were addressed and results provide opportunities for future studies.

Methodological Limitations

The methodological limitations of the study included the type of study (e.g., retrospective study), reliability of patient's ethnicity, and comparison to the general population. First, the retrospective study used data that was already collected. As

mentioned previously, key statistics (e.g., SES, logistical, situational, and attitudinal variables) could not be measured. This is a limitation to using retrospective data since data analyzed was only data that could be obtained from the computer medical records.

Second, the reliability of patients' race/ethnicity was based on patients' self-reports of their ethnicity. There are no established criteria to determine individuals' race/ethnicity. The concepts of race/ethnicity are both socially and culturally defined. As such, individuals' subjective interpretation of their "self-identify" is based on their perception of their own socially constructed identity which may not often be what society may categorize them to be. For example, patients who identify themselves as Native Hawaiian/part-Hawaiian may be categorized as Asian (or another race/ethnic group) by the general populace other than Native Hawaiian/part-Hawaiian.

Finally, the sample selection process may be susceptive to bias in data selection due to non-random sampling of the patients computerized medical records selected for the study. The inclusion criteria were limited to patients 65 years and older, diagnosed with diabetes mellitus type 2, and enrolled in the Kaiser Permanente, Hawai'i region Senior Advantage health plan. The bias existed due to the potential flaw in the sample selection process, where certain particular attributes (e.g., age 65 years old and over, diagnosed with diabetes mellitus type 2, etc.) were included and other subsets of the data were systematically excluded. Therefore, the generalizability of the study was limited to Kaiser Permanente members, age 65 years old and over, diagnosed with diabetes mellitus type 2.

Future Directions

The study provides opportunity for future research in the realm of compliance in appointment keeping among older diabetic patients in a large HMO. A similar study by Parker and colleagues (2011) that examined racial/ethnic differences in appointment keeping in Kaiser Permanente Northern California region did not include Native Hawaiian/part-Hawaiian or Other Pacific Islanders due to small sample size (Parker et al., 2011). This study was one of the first to have a large enough sample size to be able to examine Native Hawaiian/part-Hawaiian as a separate racial/ethnic group from other racial/ethnic groups within the Kaiser Permanente system.

This was the first study that focused on a culturally diverse, fully insured, diabetic population that was enrolled in the Kaiser Permanente Hawai'i region Senior Advantage health plans. The Senior Advantage health plan (or Medicare Part C or Medicare Advantage) provided equivalent coverage provided under Part A and Part B of Medicare. There are different types of Senior Advantage health plans. For Oahu and Maui residents, the two types of plans are the Senior Advantage Basic Plan and the Senior Advantage Enhanced Plan. For Big Island residents, the two types of plans are the Senior Advantage Essential Plan and the Senior Advantage Essential Plus Plan.

Each of these plans has different: monthly premium rates; annual deductibles; annual out-of-pocket co-payment maximum for certain services; out-patient physician costs; lab and x-ray costs; and in-patient hospital and emergency room visit costs. Included in the above plans was the prescription drug coverage (Medicare Part D). The co-payment and co-insurance for the prescription drug coverage was similar with each plan. However, patients who reach the initial coverage limit or require specialty

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medications would have different out-of-pocket co-payment and co-insurance for their drugs.

Future studies should focus on the financial costs that may impact older adult diabetic patients and examine the relationship the financial costs have on their compliance in their pre-scheduled out-patient clinic appointment. Racial/ethnic older diabetic patients may recognize that compliance in appointment keeping is important; however, financial constraints may impede compliance. Compliance in appointment keeping may be associated with differences in out-of-pocket co-payment with each plan or associated with the number of office visits and the cost incurred from each additional office visit. Medication cost directly related to having diabetes mellitus type 2 (e.g., diabetic medication, test strips, etc.) or cost indirectly related to the disease (e.g., medications for other chronic diseases that are associated with diabetes mellitus type 2, adaptive equipment needed as a result of diabetic related co-morbidities, etc.) are factors that may affect patients' compliance in appointment keeping, even when the appointments are pre-scheduled for them.

Finally, the State of Hawai'i was unique in that a large majority of older adults have family members (82%) or friends (41%) providing care (Executive Office on Aging, 2006). According to the Executive Office on Aging (2006), family caregivers provide a variety of support to the older adult (e.g., assistance with activities of daily living and instruments of activities of daily living, emotional support, companionship, etc.) (Executive Office on Aging, 2006). Studies on predictors of patient compliance have observed a positive association between compliance and having a social network in the form of a spouse, significant other, friend or family (Anderson et al., 2010; Misra &

Lager, 2007). In addition, studies have shown that intact social support networks were protective factors that reduced the stressors associated with having diabetes mellitus type 2 (Gallant, 2003; Misra & Lager, 2007; Nicklett & Liang, 2010; Rubin & Peyrot, 1999; Tillotson & Smith, 1996; Toljamo & Hentinen, 2001; Williams & Bond, 2002).

Other studies have reported family and spousal support had a significant impact in adult diabetes mellitus type 2 management outcomes (Glasgow & Toobert, 1988; Gonder-Frederick, Cox, & Ritterband, 2002; Mercado & Vargas, 1989; Schafer, McCaul, & Glasgow, 1986; Trief et al., 2003). Although not measured in the current study, future studies should examine the strength of these relationships by different age groups, by race/ethnicity, and by sex. In addition, future studies should ask the question why patients were compliant (or not compliant) in appointment keeping. A potential approach would be through advance care planning with older diabetic patients.

Conclusion

The study contributes to the literature on disparities in health and health care by examining the role that patient- level variables have on patient's compliance in appointment keeping among patients with a chronic illness. The study was unique for several reasons. First, each of the seven racial/ethnic groups, which the literature identifies as racial/ethnic minority groups, observed in the study had a large enough sample size to be included in the study. In addition, Native-Hawaiian/part-Hawaiian could be independently categorized and separately analyzed from racial/ethnic groups in the state.

Second, this was the first study that focused on a culturally diverse, fully insured, diabetic population that is enrolled in the Kaiser Permanente Hawai'i region Senior

Advantage health plans. Third, there was a significant distinction of the current study

when compared to other studies was that age group was not categorized as ages 65 years

and older but separated into three different age groups.

Social policy efforts that attempt to address racial/ethnic disparities on the

national level have resulted in Medicare managed care plan initiatives, such as HMOs.

The impact of the HMO model has mixed findings on reducing racial/ethnic disparities in

health care (Fiscella & Franks, 2005; Haas et al., 2002; Hunt et al., 2005; O'Connell &

Brown, 2003; Schneider et al., 2001; Stevens & Shi, 2002). However, results of the

current study were encouraging and the HMO model may have important implications in

the State of Hawai`i in reducing barriers to health care access, in standardizing services,

and in improving quality of care encountered by racial/ethnic minority groups. Moreover,

Kaiser Permanente's approaches and practices may have important implications in how

care is delivered and how health care providers communicate with and treat racial/ethnic

minority older adults diagnosed with diabetes mellitus type 2. In addition, two policy

recommendations were discussed as strategies to understand and potentially improve

patients' compliance in appointment keeping.

The researcher's findings have important implications for social work practice.

The primary implication was that both administrators and practitioners need to recognize

the complexities that surround compliance in appointment keeping among racial/ethnic

older patients diagnosed with diabetes mellitus type 2, and that special attention was

needed to understand patient health beliefs and other factors in patients' compliance in

appointment keeping and for them to engage in the health care system. The exponential

growth of the older adult population, especially racial/ethnic minority older adults, as

well as the prevalence of diabetes mellitus type 2 which were shown to increase with age only underscores the importance of addressing disparities in diabetes outcomes. Results of the analysis should be interpreted with caution since several limitations were identified. Nonetheless, the study contributed to the understanding of compliance in appointment keeping and the results were promising in that racial/ethnic minority disparities can be impacted in certain health care settings with the appropriate practices in place. Future studies are needed to address disparities in compliance in appointment keeping. If disparities persist, it would potentially result in adverse clinical consequences for older adults with diabetes mellitus type 2 and perpetuate the negative outcomes for future generations. This study has formed the foundation to which other studies may be predicated on in the future.

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