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Correlates of voluntary HIV testing and counseling among middle aged and older Latinas :

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CORRELATES OF VOLUNTARY HIV TESTING AND COUNSELING AMONG

MIDDLE AGED AND OLDER LATINAS

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Shelley L. Craig

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To: Dean Ray Thomlison
      College of Social Work, Justice and Public Affairs

This dissertation, written by Shelley L. Craig, and entitled Correlates of Voluntary HIV Testing and Counseling Among Middle Aged and Older Latinas, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

Frederick L. Newman

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Date of Defense: November 1, 2007

The dissertation of Shelley L. Craig is approved.

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ABSTRACT OF THE DISSERTATION

CORRELATES OF VOLUNTARY HIV TESTING AND COUNSELING AMONG

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by

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This study identifies and describes HIV Voluntary Counseling and Testing (VCT) of middle aged and older Latinas. The rate of new cases of HIV in people age 45 and older is rapidly increasing, with a 40.6% increase in the numbers of older Latinas infected with HIV between 1998 and 2002. Despite this increase, there is paucity of research on this population. This research seeks to address the gap through a secondary data analysis of Latina women. The aim of this study is twofold: 1) Develop and empirically test a multivariate model of VCT utilization for middle aged and older Latinas; 2) To test how the three individual components of the Andersen Behavioral Model impact VCT for middle aged and older Latinas. The study is organized around the three major domains of the Andersen Behavioral Model of service use that include: a) predisposing factors; b) enabling characteristics and c) need. Logistic regression using structural equation modeling techniques were used to test multivariate relationships of variables on VCT for a sample of 135 middle age and older Latinas residing in Miami-Dade County, Florida. Over 60% of participants had been tested for HIV. Provider endorsement was found to be the strongest predictor of VCT (odds ration [OR] = 6. 38), followed by having a clinic as

a regular source of healthcare (OR=3.88). Significant negative associations with VCT included self rated health status (OR=.592); Age (OR=.927); Spanish proficiency (OR=.927); number of sexual partners (OR=.613) and consumption of alcohol during sexual activity (.549). As this line of inquiry provides a critical glimpse into the VCT of older Latinas, recommendations for enhanced service provision and research will be offered.

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Chapter I

Introduction

The foundation of HIV prevention is Voluntary Counseling and Testing (VCT). Most interventions, such as social marketing campaigns and outreach initiatives encourage both HIV negative and positive individuals to test. The National Institute of Health Fiscal Year 2002 Plan for HIV-Related Research suggests that a priority for future research should be to develop, test, evaluate and sustain prevention interventions in racial and ethnic minority communities to prevent primary and secondary HIV transmission (NIH, 2002). In accordance with that recommendation, this study includes VCT as the primary measure of service utilization.

The increasing rates of HIV/AIDS in older Latinas mandate study of the factors that may impact their utilization of VCT services. Older Latinas can be described as a *hidden* population, due to (a) the lack of recognition by providers, (b) little empirical research and (c) their increase in HIV infection. In order to inform effective interventions, research studies on the health utilization patterns and sexual health needs of older Latinas are necessary. Indeed the timeliness of this study topic is exemplified in the 2004 International Conference on AIDS *Access For All* theme which highlighted the increasing risk of HIV/AIDS in women of all ages, and the importance of tailoring services to their needs. Persons aged 50 years and above have been excluded from recommendations by the Office of the Surgeon General for sexual risk screening; only women up to the age of 44 and men up to 49 have been recommended for screening (DHHS, 2000). Despite the enormous costs of the epidemic, at approximately 1 million dollars per sero-positive case (Pinkerton, Holtgrave, Willingham, & Goldstein, 1998), no

studies found by this researcher have examined the association between aging, cultural identity and VCT. Compounding the increase of HIV/AIDS in older minority populations is a lack of services that address the dual concerns of aging and HIV risk. A lack of research informed service provision could exacerbate the disparities felt within this population. Thus, the goal of this dissertation is to examine factors associated with HIV testing among older (> 45) Latinas.

<center>Overview, Trends and Prevalence</center>

Middle aged and older women (defined as age 45 and over) have been called "the most invisible population affected by the HIV/AIDS pandemic in the United States" (Tangenberg, 2002, p. 281). Population projections estimate that seniors in the United States (U.S.) will increase to 70 million by the year 2030. Such projections have prompted interest in their health service utilization (Aroian, Khatutsky, Thanh, & Balsam, 2001). Despite a recognition of the "graying" and "feminizing" of HIV/AIDS (Poindexter & Keigher, 2004), older women remain an understudied population. Conspicuously absent is research about older Latina[1] women, particularly with regard to the impacts of culture and aging on their risk and protective behaviors (Goodroad, 2003; Savasta, 2004). One reason for the paucity of research regarding older Latinas may be marginalization on several levels. Older women may experience a sort of triple jeopardy caused by being a) older, b) female, and c) minority group members. Separately all three groups have traditionally been underserved. It stands to reason that when these

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[1]The term Latinas and Hispanics will be used interchangeably throughout this paper in compliance with the choice of terms used by previous researchers.

characteristics are combined, a subgroup emerges which has received minimal research and national prevention intervention efforts (Falvo & Norman, 2004; Reid, 2000).

The rate of new cases of HIV/AIDS in older people is increasing; indeed by the end of 2000 over 90,000 individuals over age 50 had been reported with AIDS (Keigher, Stevens, & & Plach, 2004; Lieberman, 2000). According to the Centers for Disease Control (CDC), the number of People Living with AIDS (PLWA) over age 55 increased approximately 72% between 2000 and 2003 (CDC, 2002a). Women's rate of AIDS infection has increased from 7% in 1986 (Wingood, 2003) to over 26% in 2005 (CDC, 2003a) and in older women the rate nearly doubled from 8% in 1994 to 15% in 2000 (CDC, 2000, 2003c).

As the rate of new cases of HIV/AIDS in older adults is increasing, the trends in Latina women are also particularly disconcerting. Latinos are already the largest minority group in the country and their rapid population growth is expected to continue (Guzman, 2001). Over 20% of AIDS cases diagnosed are among Latinos (CDC, 2007). The National AIDS Behavioral Surveys (NABS) established that the incidence of AIDS in the U.S. is three times higher for Hispanics than for non-Hispanic whites. Furthermore, Hispanics have been found to be less aware of the presence of HIV testing than other racial and ethnic groups (Sabogal & Catania, 1996). Across all demographic groups, including Latinos, the highest rate of HIV infection occurs in Men who have sex with Men (MSM) (Coleman, 2003). In 2005, Latinas represented 17 % of all Hispanic cases (CDC, 2003c) compared to 10% in 1989 (CDC, 2003c). Approximately 20% of all women ever diagnosed with AIDS are Latina (Zambrana, Cornelius, Boykin, & Lopez, 2004). Older Latinas over age 55 comprise approximately 5.5% of all Latina PLWA

(CDC, 2003d). Among Latina women ages >45 the rate of HIV infections dramatically increased by 40.6 % during 1998-2002 (CDC, 2004). The CDC estimates that 70% of all Latina PLWA acquired the disease through heterosexual means (CDC, 2003d). Intravenous Drug Use (IDU), the second most prevalent route for transmission in most female subgroups, represents only 5% of cases among older Latinas and a small percentage acquired the disease from a blood transfusion prior to 1985 (CDC, 2004).

South Florida Trends

South Florida provides a unique context in which to study HIV/AIDS in middle age and older Latinas. Florida is, and will continue to be home to more individuals 65 and older than any other state (Meyer, 2001). Miami has the highest HIV/AIDS rate per capita of any city in the state (CDC, 2003d) and the rate of new cases increased by one-third in 2004 (Tasker, 2005). Over 61% of Miami-Dade County's more than two million residents are Hispanic (Census, 2006) while representing 32% of People Living with HIV (PLWH) (MDCHD, 2006). In comparison, 20.3% of the total population is African American/ Black yet account for 44% of all PLWH. Finally, non-Hispanic Whites comprising 18.6% of the county residents and 14% of all PLWH (Census, 2005). National studies estimate that among all women age 50 and older, Latinas represent a proportion slightly less than White (26%) or Black (53%) non-Hispanics (CDC, 2003c) yet these figures are not indicative of local epidemiology. In Miami, Latinas comprise 24% of all women over 50 diagnosed with HIV (MDHD, 2005). Newly diagnosed older Latinas indicated heterosexual contact as the most frequent route of transmission (49%) followed closely by "unknown" (42%). These two categories cumulatively account for

91% of all cases (CDC, 2004). Such local data indicates the importance of undertaking research endeavors to address persistent disparities and undiscovered patterns in infection and health utilization rates.

<center>Outline of Subsequent Chapters</center>

In the next chapter, literature relevant to the use of VCT among older Latinas in the United States is presented. Previous research on health service utilization as well as the history of VCT and its importance to HIV prevention initiatives throughout the pandemic is explored. Such factors include demographics, sexual risk factors and general health service utilization. In addition, the Andersen Behavioral Model (ABM), the primary theoretical perspective utilized in this study is explained. Although most previous research utilizing the ABM does not apply it to VCT or utilize measures of cultural identity, this chapter will discuss such integration into the ABM. The chapter will also discuss the application of the ABM to VCT, which is unique to this study.

Chapter Three presents the methods and analytic techniques used to answer the primary research questions about VCT among older Latinas. The specifics of data collection, sampling design and variable measurement are described and the formal hypotheses regarding expected relationships are identified. Finally, an overview of structural equation modeling as the analytical approach is discussed.

Chapter Four presents the findings of the empirical tests of the hypotheses regarding the various predictors of VCT. Descriptive and summary statistics for all variables as well as a detailed analysis of their correlations are presented. The results and significance of the various hypotheses regarding the individual level and contextual level correlates of VCT are reported. This chapter continues with the findings of the empirical

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tests of the full structural equation model and the effects of predisposing, enabling and need variables in predicting VCT.

Chapter Five summarizes all findings and examines the extent to which the hypotheses presented in Chapter three are supported by the data. Study limitations are examined. Finally, implications of the research on policy and practice and future research are identified.

Chapter II

Review of the Literature

Sexuality

Seventy-seven percent of persons 50 and older think they have no chance of becoming infected with HIV, according to the National Health Interview Survey (DHHS, 2002). Yet, recent research confirms that older adults are engaging in the leading heterosexual risk behavior for transmission of HIV: unprotected sexual relations with multiple partners (Falvo & Norman, 2004; Mueller, 1997; Stall & Catania, 1994). Older adults have been outside of primary HIV prevention efforts over the past two decades yet older adults report regular sexual activity and satisfaction (Falvo & Norman, 2004; Johnson, 1998; Matthias, Lubben, Atchison, & Schweitzer, 1997; Sherman, Harvey, & Noell, 2005; Stark, 2006).

Many middle aged and older adults came of age during the so called "sexual revolution" and may have more relaxed and open attitudes toward sex than the generations that preceded them (Johnson, 1998). Expectations of continued health, virility and longevity (Goodroad, 2003), and the support of an expansive medical industry may also have contributed to efforts to enhance the sex lives of older people (Coleman, 2003; Emlet, Tangenberg, & Siverson, 2002). The utilization of drugs and other medical treatments such as hormone replacement therapy and the aforementioned Viagra® have considerable promise for increasing sexual performance, and may increase the prevalence of sexual behavior among older men and women (Coleman, 2003; Savasta, 2004). Although studies have not yet tested whether there is a link between erectile enhancers and HIV transmission, or increased risky sex practices, there is speculation in the

literature that they may an influential factor (Karlovsky, Lebed, & Mydlo 2004). There is also research that is suggestive of such a linkage. For example, Mason (2003) found that older women in relationships with men who took Viagra and engaged in unprotected sex with multiple partners were significantly more likely to be diagnosed with STD's than their counterparts. Despite this increased focus on the positive nature of older adult sexuality, rarely are the risks associated with increased sexual activity discussed in relation to the new medical and technological advances (Kingsberg, 2002; Neundorfer, Harris, Britton & Lynch, 2005; Ruhl, Fox, Sinclair, Stamps, Tabloski, Zurakowski, 2006; Sherman, Harvey, & Noell, 2005). Such relationships between medical advances, sexual risk behavior and older women represent an area ripe for study.

Physical changes

Some natural aging processes may put older women at increased risk of HIV-infection through heterosexual sex practices (Goodroad, 2003). Older adults generally have low levels of resistance to HIV-infection (Coleman, 2003), which is compounded by changes associated with menopause for many women (Padian, Shiboski, Glass, & Vittinghoff, 1997) A reduction in estrogen and vaginal lubrication can cause thinning of the vaginal walls and increase friction during intercourse (Goodroad, 2003). This may lead to vaginal tears and a greater chance of HIV viral entry (Mack & Bland, 1999; Savasta, 2004; Tangenberg, 2002). These biological changes may make viral transmission more likely in older women than in younger women (Emlet et al., 2002; Theall, Elifson, Sterk, & Klein, 2003). The increased vulnerabilities of age are also complicated by gender. For women, the risk of HIV infection during heterosexual sexual activity among HIV discordant couples is at least eight times more likely than female to

male transmission, primarily due to vaginal susceptibility (Padian et al., 1997). Although these risks have not yet been tested with older women, such factors may conspire to make older women particularly susceptible to HIV infection through heterosexual transmission.

Higher risk once infected

Aging can also lead to faster disease progression. McDavid, Li & Lisa (2006) determined that between 1999 through 2004 rates of new HIV diagnoses decreased significantly for women except those aged 50 and older. Mack & Ory (2003) found that 18.9% of persons living with HIV/AIDS are 50 years of age or older. Many older women reach a very advanced stage of the disease before they are diagnosed and are most frequently hospitalized for an undisclosed HIV-related illness (Mack & Bland, 1999). The disease can remain undetected for some time, due in part to HIV symptoms that resemble normal aging processes (Goodroad, 2003), along with the tendency of health care professionals to not suspect HIV-related health concerns in this population (Emlet & Farkas, 2002). This can lead to HIV symptoms going undiagnosed, misdiagnosed or diagnosed much later than in younger populations (Emlet et al., 2002; Hillman, 2000; Wooten-Bielski, 1999). For example, older adults more frequently develop HIV dementia than their younger counterparts. This acute onset syndrome, often called AIDS dementia complex, is caused by an HIV infection in the central nervous system (Emlet et al., 2002). In older persons this is frequently mistaken by clinicians as Alzheimer's or Parkinson's disease, whereas in younger populations it is accurately diagnosed.

The age related weakening of the immune system may also facilitate faster conversion of HIV to AIDS in older adults compared to their younger counterparts (Coleman, 2003; Emlet et al., 2002; Nokes, 1996; Strombeck & Levy, 1998). Inungu,

Mokotoff, & Kent (2001) found that persons over 50 tended to have lower CD4 counts, an indicator of disease-progression, than their younger counterparts at the time of diagnosis. Delays in diagnosis translate to treatment delays, which can compromise quality and length of life (Goodroad, 2003). Indeed, patients over 50 years old at the time of diagnosis, were found to live only 7 years, on average, while those aged 13-49 lived almost 12 years on average (Inungu, Mokotoff, & Kent, 2001). In fact, it is common for older women to die within a month of being diagnosed with AIDS because of the advanced stage of illness (Mack and Bland, 1999). The risks to older women when infected with HIV press the need for urgent prevention and education efforts.

Voluntary HIV Counseling and Testing

Voluntary HIV Counseling and Testing (VCT) consists of an individualized intervention of two sessions designed to inform clients of their current sero-status and provide sexual risk and prevention education (CDC, 2003a; Sabogal & Catania, 1996). VCT has long been the cornerstone of HIV prevention initiatives (Valdiserri, Robinson, Lin, West, & Holtgrave, 1997). Since approximately 24%-27% of the 1,039,000 – 1,185,000 people infected with HIV in the United States (US) are not aware of their infected status (Marks et al, 2006), the utilization of VCT could allow them to prevent transmission to others and enter early treatment to reduce mortality (CDC, 2001; 2006). Late testing, after which there is a rapid progression to AIDS within one year of VCT, is seen particularly in older, low income, heterosexual and minority populations (CDC, 2003c). Furthermore, Levy-Dweck (2005) suggested that annual VCT is a method of preventing fast progression to death from co-morbid conditions among older PLWH. In a

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study done at the Harlem Hospital Center in New York City, 5% of patients 60 years of age and older who died in the hospital were HIV-positive. Systematic reviews of patient charts found that there was no suspicion of HIV infection and no referrals to VCT while alive (Zelenetz & Epstein, 1998). Throughout the pandemic, the Center for Disease Control (CDC) has released national guidelines designed to encourage individuals at high risk for infection to seek testing and agencies to increase overall access to VCT. HIV testing first became available in 1985 to protect the blood supply (CDC, 1993). As blood banks became overwhelmed with persons trying to learn their sero-status, alternative test sites such as AIDS Service Organizations (ASO) were established. In 1987, the United States Public Health Service, the predecessor of the CDC, issued its first official guidance that made VCT an important part of the prevention strategy for those at high risk of HIV infection, particularly those seeking treatment for Sexually Transmitted Diseases (STD). In 1993, CDC recommendations expanded to include VCT for patients in acute care settings (CDC, 1993). The guidelines were revised again in 2001 to incorporate routine VCT for pregnant women. Targeted VCT after a thorough risk screen was still the policy for low risk settings (CDC, 2001). In 2003, the CDC unveiled "Advancing HIV Prevention: New Strategies for a Changing Epidemic" which suggested VCT for all clients in high-prevalence facilities such as prisons, drug treatment centers and STD clinics (CDC, 2003). The most recent revised guidelines directed that all patients in all health care settings should be routinely tested for HIV and that such test results should be communicated in same manner as other diagnostic tests (Branson et al., 2006).

Many studies have found that VCT decreases with age (Fernandez et al., 2003; Kalichman, Kelly, Morgan, & Rompa, 1997). Data from the 2000 Behavioral Risk Factor

Surveillance System (BRFSS) showed that rates of VCT varied as 56% of 18 to 29-year-old reported VCT compared with only 33% of those ages 40 to 49 years old (Takahashi, Johnson, & Bradley, 2005). It is particularly noteworthy that the BRFSS does not collect any data related to sexual health or risk factors for adults over age forty-nine. Such neglect ensures that multiple sources of information about sexual behaviors of older adults remain more difficult to obtain. Despite a lack of detailed information about risk factors, the National Health Institute Survey (NHIS) does collect some basic data. Using the NHIS sample, (Anderson, Carey, & Taveras, 2000) found that 10.4% of adults with one or more HIV risk factors between the ages of 45 - 64 reported VCT. Of all adults getting an HIV test in 2002, 19.6% of those tested were age fifty and older (J. Inungu et al., 2001). Gender also seems to impact VCT differently by age. Up to age 50, women are the most likely to get an HIV test, while among seniors, men are more likely to obtain VCT (Bond, Lauby, & Batson, 2005).

Among those tested, national surveys have found being over 45 years old is a strong predictor of both initially refusing VCT as well as not returning for test results (Ebrahim, 2004). Stout, Ratard, Southwick, & Hamilton (2002) found that older patients (>50) were significantly less likely than middle-age patients (between 40-49) to accept testing when offered. Furthermore, Liddicoat, Losina, Kang, Freedberg, & Walensky (2006) found that older patients generally refused testing because of a perceived lack of risk. Despite this perception, individuals over 40 years old made up 45% of new HIV diagnoses reported to the CDC in 1999 (CDC, 2004). While it is encouraging that the overall numbers of seniors pursuing VCT are gradually increasing (Holtzman, Rubinson,

Bland, & McQueen, 1998) additional research is needed to understand the phenomenon among older Latinas.

Cultural Issues

Many HIV related risk behaviors may also be understood as culturally specific practices (Jenkins, 2000, p. 755). Some risk factors seem inextricably tied to ethnicity or culture (Betancourt, Green, Carrillo, & Ananeh-Firempong II, 2003). Several interrelated cultural constructs that may underlie the sexual behavior of Latinas include machismo, marianismo, respeto, acculturation and nativity.

Machismo

The concept of machismo has often been subject to stereotype and misunderstanding. In traditional Latino culture machismo refers to both positive and negative male gender roles and expectations. These include provision and protection for their families as well as virility, strength, aggression and low sexual control as well as (Diaz, 1998; Felix-Ortiz, Abreu, Briano, & Bowen, 2001; Gupta, 2002). There is often value placed on a high level of sexual experience and numerous partners (Marin, Gomez, & Hearst, 1993). Some authors have suggested that the resistance of Latino males to risk erection loss through condom use or other non-penetrative sex practices may be related to an association with penetration and machismo (Diaz, 1998; Felix-Ortiz, Abreu et al., 2001). Moreover, condoms may be considered a barrier to intimacy, relationship control and manhood (Culturelinc Corporation & Institute, 1989; Diaz, 1998).

Marianismo

Marianismo is the term for the traditional ideal of the submissive Latina women. It is most often characterized by traits of purity, innocence and moral superiority

symbolized by the Virgin Mary (Gupta, 2002). Latina women are expected to devote their energies to supporting the family unit and prize familial relationships above all others (Marin, 2003). In contrast to the concept of machismo, women are expected to retain sexual innocence and "defer to their partners" with regard to sexuality (Alonso & Koreck, 1989). Marianismo may present a barrier to safer sex negotiation and condom use because of the underlying notion that a "good" woman is submissive and sexually innocent. An insistence on the use of condoms may be often resisted since it may suggest sexual knowledge or experience and thus be in conflict with cultural expectations (Messina, 1994). Such traditional values may preclude the candid discussion of sexuality. Moreover, the suggestion that a woman may have sexual knowledge, or want it, may introduce concerns about faithfulness and promiscuity (Marin & Gomez, 1998) and thereby risk damaging the relationship (Marin et al., 1993; Salabarria-Pena, Lee, Montgomery, Hopp, & Muralles, 2003).

Although these concepts of masculinity and femininity are dynamic and not universal (Gupta, 2002) their prevalence may increase HIV/AIDS vulnerability. The fact that males may be engaging in sex with multiple partners, combined with the women's need to project sexual innocence may make it very challenging for a Latina wife to insist on protection (Alonso & Koreck, 1989). The CDC (2002) suggests that one of the reasons for the high Latino rates of HIV infection may relate to the this double standard for sexual behavior in which men are expected to be sexual beings and women are expected to be sexually silent, innocent and not question their partners. Traditional Latino gender roles may present a serious challenge to the effectiveness of most current HIV prevention

efforts, since most prevention curricula are based on expectations that women negotiate or refuse unsafe sex and expect men to strive for fidelity (Gupta, 2002).

Respeto

The concept of respeto relates to the high value placed on families within this culture (Alonso & Koreck, 1989). Respeto, in the context of women's familial relationships, refers to a woman's obligation to maintain peace and defer to her husband out of respect (Marin, 2003; Marin & Gomez, 1998). A study of younger Latinas found that respeto was often a point of cultural differentiation between themselves and non-Latinas whom they considered to be disrespectful to men (West, 2001a). They also felt that any change from their prescribed roles would indicate a lack of respect for males. Although not studied in older Latinas, their younger counterparts who were unemployed and adhered closely to cultural role expectations had less accurate HIV prevention knowledge than those that were employed or espoused less traditional beliefs (Bowleg, Belgrave, & Reisen, 2000; Gupta, 2002; Salabarria-Pena et al., 2003; Saul et al., 2000).

Traditional Latino culture is considered to have a more allocentric or collective orientation than its Anglo-American counterpart. This may increase feelings of shame or guilt for individual actions that may bring stigma onto their entire families (Zea, Reisen, & Diaz, 2003). Cultural attitudes such as respeto could create such an aversion to frank discussion of sex and sexuality and may produce what some authors refer to as "sexual silence" (Alonso & Koreck, 1989). This silencing may be one of the most profound barriers to safe sex within this traditional interpretation of culture, resulting in difficulties with sexual communication or safer sex negotiations (Diaz, 1998; Marin & Gomez, 1998). The close cultural association of HIV/AIDS risk with traditionally taboo issues

such as homosexuality, female promiscuity and drug use, makes discussion by women particularly difficult since they are responsible for maintaining harmony, and such conversations seem likely to create discord by raising issues considered inappropriate in traditional contexts (Brown & Sankar, 1998; Marin, 2003).

Marital Status

Relationship status has been found to be important to both accurate risk perception and VCT. Latina women in heterosexual relationships, who believe they are uninfected, and who are monogamous and non-Intravenous Drug Users (IDU) may believe that are not at risk for HIV. As a consequence they are unlikely to use protection or seek VCT (Bowleg et al., 2000; Brown & Sankar, 1998). Unfortunately, research has shown that this group is less likely to be accurate in their belief about their partner's HIV-status than those in casual relationships. Niccolai, Farley, Ayoub, Magnus and Kissinger (2002) conducted a small study of adults attending public health clinics and found 42% of those thought by their partners to be uninfected actually were HIV-positive. Furthermore, in 2002, of all U.S. adults reporting VCT, 49.5% were married, 31.2% were never married and 19.3% were widowed or divorced (Inungu, Quist-Adade, Beach, Cook, & Lamerato, 2005). Another study found that married persons were more likely to report previous VCT than single respondents (Norman, 2006). The issue of marital status may present a barrier to VCT within this population of older Latinas.

Acculturation

Acculturation has been described as the process during which immigrants typically modify their attitudes and behaviors because of contact with a dissimilar culture (Berry, 1980; Sabogal & Catania, 1996; Valentine, 2001). Latino acculturation is

considered by some authors to be unique because of particularly strong affiliations with their countries of origin, illustrated in more frequent returns home than their European or Asian immigrant counterparts (Valentine & Moseley, 2000). During the process of acculturation, younger Latinas seem to internalize some of the prevailing U.S. attitudes and behaviors regarding sexuality (Marin et al., 1993). Acculturated Latinas are more likely to engage in risky sexual activity (Marks, Cantero, & Simoni, 1998; Nyamathi, Bennett, Leake, Lewis, & Flaskerud, 1993; Salabarria-Pena et al., 2003) although they are not necessarily more knowledgeable about risks and were less likely to take precautions or obtain VCT than their non acculturated counterparts (Newcomb et al., 1998). Compared to Latinas born in the U.S., Latinas who have recently immigrated, and who have less than 12 years of education, have been found to retain erroneous beliefs about HIV (such as transmission via toilet seats or hand-shaking), despite expressed awareness of the medical facts (Flaskerud & Calvillo, 1991; McQuiston & Flaskerud, 2000). West's (2001b) qualitative study found some of the Latinas she studied were both aware that their partners were involved in extramarital sexual relations and believed that it was his right to do so. By contrast, more acculturated Latinas indicated that they were more likely to engaged in sex with multiple partners and had elevated levels of disclosure of HIV status to sexual partners (Marks et al., 1998).

In addition to the challenges outlined above, there appear to be some benefits associated with acculturation. For example, acculturated women are more likely to carry and use condoms than their less acculturated counterparts (Flaskerud, Uman, Lara, Romero, & Taka, 1996). Soler, et al., (2000) suggested that acculturated Latina's high levels of condom use, was a function of "Hispanic people's high adaptability to their

environment" (p. 87-88). Specifically, Latinas practiced effective indirect approaches to condom use like eroticizing safer sex that did not challenge traditional cultural norms of machismo. However, considerable further investigation will be necessary to determine whether similar effects carry over into older women.

Nativity

Nativity refers to country of birth (Census, 2003). Ethnic categorizations of either Hispanic or Latino account for a remarkable diversity of cultures and nationalities. Mexican Americans comprise the largest percentage (58.5%) of Latinos in the United States, with Puerto Rican (9.6%), Central American (4.8%), South American (3.8%), Cuban American (3.5%) and cumulative other (19.8%) rounding out the total (Galanti, 2003). Despite this diversity, some research has shown that immigration status may have a greater impact on risk behaviors and health outcomes than country of origin. A failure to distinguish between immigration statuses may focus too much on Latino intracultural patterns that may have less overall impact on risk factors (Padilla & Glick, 2000). Moreover, the distinction between foreign or U.S. born could be an important factor in heath service utilization generally (Hunt, Schneider, & Comer, 2004). Immigration to the United States often impacts overall health outcomes by increasing stress and reducing access to health services (Vega & Amaro, 1994). Recent immigrants also retain a distinct health advantage over both long term immigrants and the native born as immigrant health seems to deteriorate over time (Fitzgerald, Chakraborty, Shah, Khuder, & Duggan, 2003). Furthermore, documented immigrants, such as permanent residents and citizens, enjoy better health than those that are undocumented (Fitzgerald et al., 2003).

Nativity (specifically U.S. or foreign born) may play a role in HIV risk and prevention service utilization. The CDC, health departments and research entities still tend to merge all Hispanics, regardless of country of origin, into one category when collecting data about HIV/AIDS and other risk factors (Mino, Deren, & Yeon-Kang, 2006; Rumbaut, 1997). Some literature about HIV risk factors also considers nativity to be of theoretical interest. Foreign-born male Latinos were found to be more likely to report more sexual partners, sex with prostitutes and being under the influence of alcohol or drugs the last time they had sex with their primary partners than their U.S. counterparts (Fernandez-Esquer, Atkinson, Diamond, Useche, & Mendiola, 2004; Organista, Balls Organista, Garcia de Alba, Castillo Moran, & Ureta Carrillo, 1997). Foreign-born Latinas had slightly higher condom self efficacy scores than U.S.-born Latinas, or foreign-born Latino men, but were less likely to report condom use in their last sexual encounter (Fernandez-Esquer et al., 2004). Recently immigrated and older Latinas report fewer sexual partners than their US and younger counterparts (Sabogal, Perez-Stable, & Otero-Sabogal, 1995). Locally, Miami has the largest proportion of foreign born residents (42.7%) of any city with under five million residents (Schmidley, 2000), and the highest percentage of immigrant Latinos of any large metropolitan area in the United States. Furthermore, the population of Miami-Dade county has continued to increase because of an influx of new immigrants, despite an exodus of domestic born individuals (Federation for Immigration Reform, 2004). Such immigration patterns provide an interesting influence on population for the study of nativity and VCT.

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Ultimately, VCT is a health care service. Issues of culture have also been found to impact Latino access to health care. Low-acculturated Mexican-Americans are less likely to seek outpatient care than their more acculturated counterparts, even when need is equal between the groups (Wells et al, 1989). Lack of language proficiency, a frequent marker of acculturation, can contribute to a sense of powerlessness in service acquisition (Ricketts & Goldsmith, 2005) Both Spanish-speaking Hispanics (43%) as well as English-speaking Hispanics (26%) reported difficulty communicating with their doctors, compared to only 16% of Whites (Doty and Ives, 2002). Components of cultural identity such as language barriers may also impact the refusal of VCT. Hispanic non- English speakers tended to refuse VCT more frequently than English speaking Hispanics, African-American or Caucasians (Liddicoat et al., 2006).

Although there is very little literature that specifically examines the cultural barriers to VCT for older Latinas (Melnyk, 1998); barriers associated with health service underutilization include such items as service availability and organization and discrimination (Awad, Sagrestano, Kittleson, & Sarvela, 2004). Predictors of mammography screenings for older Latinas included age, city of residence, health insurance and a discussion with a physician within the past two years about the procedure (Laws & Mayo, 1998). Failure to take advantage of general preventative screenings among Latinas has been correlated with lack of health insurance, fatalism, fear of finding a problem, fear of treatment side effects, and perceived disease incurability (Larkey, Hecht, Miller, & Alatorre, 2001; Mohamed, Skeel Williams, Tamburrino, Wryobeck, & Carter, 2005; Palmer, Fernandez, Tortolero-Luna, Gonzales, & Dolan Mullen, 2005). A

qualitative study that developed and tested a measure of barriers to VCT among Latinos found that, across risk groups, fatalism and confidentiality concerns emerged as the most important barrier to VCT for all risk groups (Awad et al., 2004). The second most cited barrier to VCT was fear of loss which included such concerns as losing a partner, job or health insurance if diagnosed with HIV/AIDS (Awad et al., 2004). Such concepts may also be important for older Latinas.

Finally, a particular impediment to VCT among Latinas is concern regarding immigration status. Applications for immigration visas to the United States require a negative HIV test. Furthermore, since HIV positive status is grounds for dismissal and many undocumented immigrants fear that health care agencies report medical information to immigration authorities, this policy could contribute to avoidance of VCT (Liddicoat et al., 2006). In recognition of this issue, some researchers have called for a policy shift that removes HIV status from the immigration denial list (Liddicoat et al., 2006). Such political and cultural constructs may contribute to low levels of perceived risk and VCT among older Latinas.

Other Factors that May Relate to Middle Aged and Older Latinas and VCT

Education

Studies have found mixed relationships between education levels and VCT. National surveillance data reports that fifty-eight percent of U.S. adults obtaining VCT had at least a high school diploma, compared to 25.7% with a bachelor's degree or more and 15.9% with less than a high school education (Inungu et al., 2005). Furthermore, having at least 12 years of education was positively correlated with VCT in rural

Hispanic farm workers (Fernandez et al., 2005). Other studies have found no significant differences in VCT when comparing less than 12 years to more than 12 years of education (Bond et al., 2005). Liddicoat, Losina et al (2006) found that patients with a high school education refused VCT more often than those with less than high school education (70% versus 64%) indicating more utilization for those with greater understanding of the procedure. Among People Living with AIDS (PLWA), those with higher levels of education have generally reported greater utilization of both medical and social services (Bozzette & Hellinger, 2001; Kilbourne et al., 2002).

Socioeconomic Status

Low socioeconomic status (SES) among Latinos is correlated with: higher incidences of AIDS-infection and exposure to HIV risk (Brown & Sankar, 1998; De La Rosa, 2002; Mack & Bland, 1999; B. Marin, 2003), poor health outcomes (Savasta, 2004) and lack of access to adequate health care (Andalo, 2004). More than half of women 65 and over have personal incomes of less than $10,000 a year (Census, 2002; Census., 2002) and older Latinos have higher rates of poverty than any other population (Applewhite & Torres, 2003) with Latinas nearly twice as likely as men to be impoverished (Solis, 2001). Older Latinos, consistent with other groups of older Americans, tend to be more impoverished than their younger counterparts. Older Latinas are more likely than younger Latinas to be supported by their husbands. Although economic dependence does not necessarily mean low socioeconomic status, such dependency may exacerbate their risks for HIV infection (Gupta, 2002). Younger Latinas who did not participate in financial decisions with their spouses were 80-90% less likely to use condoms regularly (Soler et al., 2000) Younger, low-income Latinas also reported

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that compared to immediate needs, such as food, shelter, and safety, the prevention of HIV becomes a relatively low priority (Amaro & Raj, 2000). A study of Latinos of all ages, determined that obtaining VCT was found to be negatively correlated with earning less than $201 a week (Fernandez et al., 2005). Although the issues related to economic status, HIV risk and VCT have not yet been studied in middle age and older Latinas, such factors deserve investigation.

<div align="center">Regular Provider of Health Care</div>

During the past thirty years, disparate access to health services between ethnic groups has been deemed socially unacceptable by federal agencies (Andersen et al, 1981; Agency for Healthcare Research and Quality, 2003; DHHS, 2003). The National Institutes of Health (NIH) define health disparities as "differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in the United States" (NIH, *n.d.*). The National Healthcare Disparities Report issued by the Agency for Healthcare Research and Quality (2003) described "pervasive" disparities among racial, ethnic and socioeconomic groups. These disparities are especially harsh for Latinos and older persons between the ages of 50 and 64 years (Powell-Griner, Bolen, & Bland, 1999). One of the indicators of a health disparity is the lack of a regular provider of health care (DHHS, 2005).

Latinas are the most likely of all race or ethnicities to report no usual source of care (19.8%); Non-Hispanic Whites (NHW) are the most likely to report that an office setting is the usual source of care (90.7%) while non-Hispanic Blacks (NHB) are most likely to utilize an Emergency Care Center or Outpatient Clinic as their usual source of care (DHHS, 2005). Women who have a usual source of care are more likely to receive

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preventative care (Ettner, 1999), to access care through a physician or emergency room, not to delay seeking help when needed (Sox, 1998), and to have lower rates of hospitalization and health-care costs (Andersen, Garnett, & Weiss, 1999). Older minority women who have a regular source of care tend to be referred for fewer screenings than their White non-Hispanic counterparts (Taira, Safran, Seto, Rogers, & Tarlov, 1997) including referrals related to sexual risk behavior and HIV education (Weinrich, Carline, Curtis, Paauw, & Ramsy, 1996). Having a regular provider of care has also been associated with VCT for younger women (Bond et al., 2005; Emlet & Farkas, 2002), although not yet studied in middle age or older Latinas.

The link between provider accessibility and VCT is particularly important to examine in light of the fact that in the U.S., the majority of HIV tests are performed at private physicians and clinics, and not publicly funded HIV test sites (Anderson et al., 2000), particularly for older populations. For example, between 1995 and 1998, of NHIS respondents reporting VCT, 64.5% had received their most recent test from private sources. Of the 35.1% VCT from public-sector sources the largest percentage were tested in community health clinics (11.8%). Somewhat surprisingly, AIDS Service Organizations (ASOs) accounted for only 1.5% of all tests (Anderson et al., 2000). Recognizing such patterns may present an opportunity to further understand the relationship between the various types of health care providers and VCT for middle age and older Latinas.

Health Status

Hispanics have the highest prevalence of reporting that their health was fair or poor (59.8%) compared to African-Americans (49.9%) and non-Hispanic Whites (42.1)

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(MMWR, 2006). Self rated health status has been determined to be related to VCT. Flykeness & Siziya (2004) and Bond, Lauby & Batson (2005) found that those that rated their health poorly were more likely to accept a VCT. In contrast, Kakoko, Lugoe & Lie (2006) found that those that rated their health more positively were more likely to have been tested. Although the relationship between health status and VCT has not been studied in older Latinas: for preventative cancer screenings, a self assessment of "poor" health was a significant predictor of seeking a preventative cancer screening (Gorin & Heck, 2005).

<div align="center">Provider Endorsement</div>

Referral to VCT

Most primary care providers do not routinely test or assess patient's HIV risk, and many health care providers do not detect important risk factors for HIV in older patients (Stout et al., 2002). Research involving older women has found that during prevention counseling, nutrition advice was offered most frequently (15%), followed by exercise (10.5%) and weight reduction (3.9%). Sexual risk was not mentioned (Stout et al., 2002). In a study in which doctors and their patients (n= 2,154) were questioned about their regular health screenings physicians tended to overestimated the amount of sexual risk discussion when compared to client self-report. This is particularly important in light of other study findings that inadequate or inaccurate physician assessment may lead to under reporting of HIV/AIDS in older women, as well as increasing prevalence of HIV-infection transmission (CDC, 2000; Savasta, 2004).

Researchers have recognized health care provider endorsement of testing as an important predictor of VCT (Fernandez et al., 2003). A study of Hispanic farm workers

found that 69.4% of those never tested would accept VCT if suggested by their provider (Fernandez et al., 2005). However, females were significantly less likely than males to accept a free HIV test during the course of that research. This suggests that the referral source for VCT may impact the decision to be tested (Fernandez et al., 2005). Furthermore, a study of never-tested Hispanic men found that physician endorsement was the strongest predictor of intention to accept a VCT within six months (Fernandez et al., 2004). Among respondents who had never been tested, 81% of men and 65% of women reported they would accept VCT if the doctor recommended it to them (Bond et al., 2005). Liddicoat et al., (2006) found that 72% of HIV patients had encounters with physicians prior to diagnosis that missed opportunities to refer them to VCT. Primary care providers may assume that patients will ask for VCT if they have not already been tested yet research does not bear out that notion (Takahashi et al., 2005). Few people accurately assess their own risk. Recent recipients of VCT stated that their main reason for testing was "just to find out" (49%), or as part of a "routine checkup" (34%). Only 4% stated that it was because they "have HIV risk" (Takahashi et al., 2005). Therefore, reliance on such patient perception combined with the inadequate job of physicians in assessing sexual risk in health care settings conspire to miss VCT opportunities.

Older women are one of the least likely groups to be offered VCT and some have suggested that this is due to a bias against testing them (Stout et al., 2002), discomfort discussing sexual issues (Chen, Branson, Ballenger, & Peterman, 1998) or attempts to conserve resources by testing only high risk patients (McCarthy, Wong, & Munoz, 1993). Despite these practices, VCT every three to five years has been shown to be cost-effective in populations with at least 1% sero-prevalence (CDC, 1993), a rate similar to

that of older Latinas. Ongoing concerns about confidentiality and legal issues and an overall lack of awareness may also contribute to low levels of testing in primary care settings (Burns et al., 2004; Liddicoat et al., 2006). A lack of referrals for testing may represent the perception among both patients and health-care providers that these groups are not a risk for HIV infection (Stout et al., 2002). The influence of health care provider screening and endorsement of VCT has not yet been examined in older Latinas.

Aspects of Health Care Provision

Older Latinas have described negative experiences such as long waiting times, language barriers, different doctors, inexperienced and uncaring staff (Murphy, Johnston, Hoffman, Molina, & Lu, 2003) and feeling "stigmatized" as challenges to obtaining preventive services (Oliva, Rienks, & McDermid, 1999). Minear and Crose (1996) listed "aloof, brusque or rude attitudes of service providers" (p. 62) as a barrier for low-income elders accessing health services. As one woman from a qualitative study by Oliva, Rienks & McDermid (1999) put it:

> If you're poor, you're not going to have a family doctor. You get sick you go to emergency. There's no one-to-one in the emergency room...[but]a family physician [will]...talk to the person, see them grow...be concerned, know them (p. 517).

For some non-English speaking Latinos, communication breakdown has been associated with frustration and feelings that health care providers are indifferent (Murphy et al., 2003). In traditional Latino culture individuals expect *"personalismo,"* an intimacy, warmth and concern that can be crucial to positive interactions with health care providers (Galanti, 2003). *Personalismo* inspires trust in the provider and confidence in the care

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which can lead to better patient outcomes and compliance (Galanti, 2003). The approach of health-care providers while discussing VCT may also impact testing rates (Stout et al., 2002). Irwin, Valdesseri & Holmberg (1996) found that when a provider strongly encouraged VCT, 30% more patients volunteered for testing. Studies have shown that an increased acceptance of routine testing correlates with an understanding of the benefits of being tested (Liddicoat et al., 2006) indicated the importance of a full explanation of the importance of the procedure. Despite a lack of empirical evidence, it seems reasonable to speculate that these same concerns might also prevent some older Latinas from seeking knowledge about their risk for HIV or requesting VCT.

There is some literature that suggests that this perception of health care professionals attitudes may be rooted in providers actual beliefs about older persons (Schigelone, 2003) and that this may have a deleterious effect on the care older patients receive (Strombeck & Levy, 1998; Zablotsky, 1998). They have been found to treat older patients less aggressively, misdiagnose their HIV related symptoms and are less likely to initiate discussions of sexuality compared to younger patients (Schigelone, 2003). Some have even suggested that practitioner attitudes toward older adults may simply be reflections of their own personal issues with aging and death (Schigelone, 2003).

Despite these challenges, a small body of research is beginning to emerge to contradict the notion that older women are uncomfortable discussing sexuality. One study found that older minority women, aged 61-82 years, although "hesitant to initiate the subject," were "ready to talk about their sexuality... when invited to do so by a caring healthcare professional" (Crose, & Drake 1993, p. 55). Although specific guidance has

not been established for middle age and older Latinas, some research suggests that those discussions need to be initiated by practitioners in health care settings using an approach that integrates questions about other health-related behaviors such as smoking, exercise and nutrition as part of a complete assessment from which health interventions, can be provided or referred as indicated (Nokes, 1996).

<div align="center">Sexual Risk Behaviors</div>

Safer Sex Practices

Despite the fact that HIV/AIDS is increasing among older women there remains a significant gap between their perceived and actual risk for HIV infection (Puleo, 1996; Theall et al., 2003). Falvo & Norman, 2004; Goodroad, 2003; Rodgers-Farmer, 1999; Stall & Catania, 1994). Although not studied in older Latinas, recent studies of black women over age 45 found that between 75% and 85% of women who stated they had no risk of HIV infection had engaged in at least one risk behavior in the previous year (Rodgers-Farmer, 1999). Women who acknowledged their risk had even greater incidences of risk practices (Klein, Elifson, & Sterk, 2003; Theall et al., 2003) yet those aged 50-64 are only one-third as likely to adopt safer sex practices as younger women (Mack & Bland, 1999).

A lack of perceived risk is also associated with low levels of accurate HIV prevention knowledge (Mack & Bland, 1999; Topolski, Gothman, Klinkenberg, O'Neill, & Brooks, 2004). Studies continue to report varying degrees of HIV-related knowledge among older women (Strong & Miller, 2001; Yates, Stellato, Johannes, & Avis, 1999). Since many older women still associate condoms with pregnancy, some older adults assume it is harmless to have unprotected sex (Williams & Donnelly, 2002). Older

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Latinas reported being afraid that if a condom slipped off during sex, it could travel from the vagina to the throat; while others feared that their reproductive organs would be dislodged upon condom removal (Wyatt et al., 1995). Most felt that discussion of condom use would elicit disapproval from their peers (Unger & Molina, 1999), and many remained hesitant to discuss issues related to sexuality (Crose & Drake, 1993). As long as older women do not recognize their risks they are unlikely to protect themselves (Catania, Kegeles, & Coates, 1990), and as long as the subject of their sex practices is neglected, they are unlikely to perceive themselves at risk (Goodroad, 2003). Although not investigated in older Latinas, studies show that older women's knowledge of HIV/AIDS can be improved through education programs (Falvo & Norman, 2004; Mack & Bland, 1999; Maes & Louis, 2003) although the impact of such interventions on sexual protection or VCT for older Latinas is unknown (Levy-Dweck, 2005).

VCT and Sexual Risk

Several studies have documented a relationship between awareness of risk and VCT. Women who perceive themselves or their communities to be at higher risk for HIV are more likely to be tested (Bond et al., 2005; Reiss et al., 2001) and studies identifying the presence of actual sexual risk factors have found a positive association with initial and repeat VCT (Anderson et al., 2000; Kalichman et al., 1997). For example, women's likelihood of VCT is increased if they engage in anal sex, have children or multiple sex partners, or use condoms infrequently (Miller, Hennessey, Wendell, Webber, & Schoenbaum, 1996). Older minority women may experience shame related to their risk practices that prevents them from revealing their circumstances (Radda, Schensul, Disch, Levy, & Reyes, 2003) or requesting VCT from health care providers (Goodroad,

2003(Falvo & Norman, 2004; Gott, 2001; Nazon & Levine-Perkell, 1996; Tangenberg, 2002). Although some studies have found that the number of sexual partners is not significantly correlated with VCT (Bond et al., 2005); others have found that having two or more new sexual partners during the past year was significantly associated with having an HIV test (Takahashi et al., 2005). Alcohol use during sex has also been determined to be a risk factor for HIV (Ford, King, Nerenberg, Rojo, 2001; Tubman et al, 2004), trigger recommendations for VCT in medical settings (Liddicoat et al) and found to be significant in those testing positive (Glick, Silva, Zun & Whitman, 2004). Msuya (2006) also found that alcohol use predicted failure to return for HIV testing results. Although not yet studied in middle age and older Latinas, research suggests that recognition of risky sexual practice may increase likelihood to seek VCT. A study of 4,371 adults that reported no HIV risk behaviors, found that 65.2% had no test, 16.2% had a self initiated VCT and 18.6% had VCT initiated by others. Of those that identified their risk behaviors, 49% reported having had a VCT in the past year and 71% of those tests were self initiated (Takahashi et al., 2005). These primary areas of concern outlined by the literature are hypothesized to be important to the utilization of VCT by older Latinas.

Theoretical Framework: Andersen Behavioral Model

The vast majority of studies of health service utilization are based on the Andersen Behavioral Model (ABM) (Andersen, 1995; Egorin, 2004; Emlet & Farkas, 2002; Gelberg, Andersen, & Leake, 2000; Hagewen, 2005; Katz et al., 2001; Kilbourne et al., 2002). This model, developed by Ronald Andersen (Andersen, 1968; Andersen, 1995; Andersen, Kravits, & Anderson, 1975) examined individual and structural

predictors of health care use. The framework (Figure 1) was created to understand health care utilization patterns, to identify equitable access to health services and to assist in policy development to enable access (Andersen & Newman, 1973). The original model defines access as equitable when demographic and need variables account for most of the variance in utilization (Andersen, 1968). Inequitable access occurs when social structure variables (acculturation), health beliefs and enabling resources (income) determine who gets medical care (Andersen, 1995). Access to care has been considered a function of individual, environmental and structural influences (Katz et al., 2001) while the identification of specific characteristics of service utilization can help increase service use prior to the onset of a specific illness (Andersen et al., 1975). The ABM has been used to both predict and explain service use by discovering conditions that either impede or facilitate utilization (Hagewen, 2006).

Andersen (1968) indicated that he wished to identify a basic framework that could allow for some variable and analytical flexibility such as feedback loops. The development of the ABM was based on a desire to understand health services that allowed inclusion of provider characteristics in addition to personal characteristics (Andersen, 1968; Andersen & Newman, 1973). In the initial application of the model to examine patterns of hospital utilization in a general population, they identified that "societal determinants of utilization are shown to affect the individual determinants both directly and through the use of health care systems" (Andersen & Newman, 1973, p.113). In their quest to understand the multidimensional and complex nature of health services utilization, Andersen and Newman (1973) studied the volume of contacts with the service delivery system, the type of care utilized (hospitals, dental care, nursing homes) and the

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motivation for seeking such care. The myriad of factors that have been found to impact

health care use and the plethora of available services necessitates a model with some

complexity. Throughout the 30 years since the development of this original model, the

predictor factors have been found to be remarkably robust for predicting a variety of

health service utilization patterns (Aday, 1974; Aday & Andersen, 1981; Andersen, 1995;

Gelberg et al., 2000).
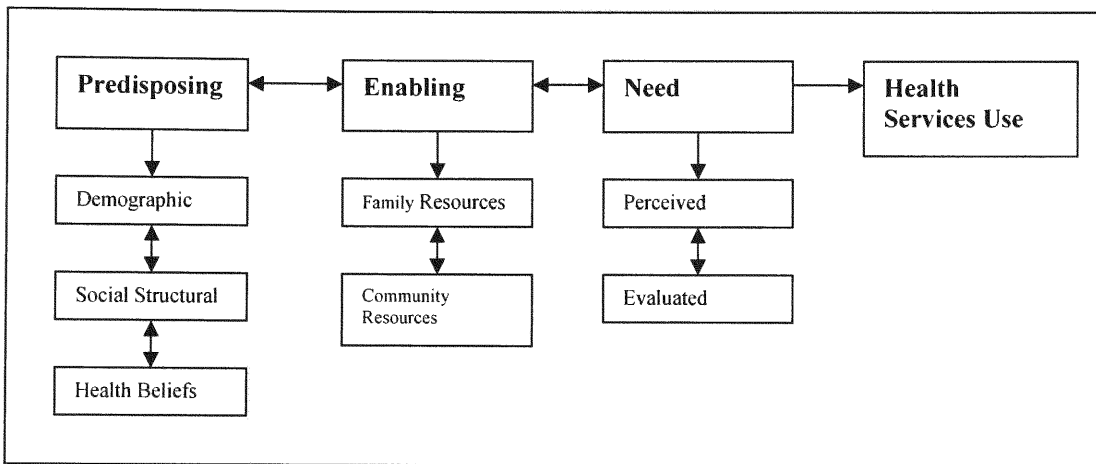
Figure 1. The *Original* Andersen Behavioral Model of Health Services Use (1968).

The ABM has evolved over time due to the changing nature of health care. In

1974, Aday and Andersen incorporated health policy, consumer satisfaction and access

components to the model (Aday, 1974) while further modifications considered access as

either potential and realized (Aday & Andersen, 1981) and addressed relationships

between the environment and health behavior (Andersen, 1995). The ABM has most

recently been adapted to identify access for vulnerable populations (Gelberg et al., 2001)

which are those groups at risk of "poor physical, psychological or social health" that

struggle to access vital medical and social services (Aday, 1974, p. 33). As interventions

increasingly have targeted health disparities, and measurement tools have become more

precise, the ABM has the evolved from examining general access using a variety of proxy variables to disparities in access for specific vulnerable populations with particular health risks. Implicit within the theoretical and empirical evolution of the model is the intent to identify priority areas to improve preventative screenings for particular populations. Most recently, it has been used to analyze the use of HIV/AIDS case management services (Egorin, 2004; Katz et al., 2001); mammography screenings among older Latinas (Laws & Mayo, 1998); colectoral cancer screenings among urban Japanese elders (Honda, 2004) and the homeless (Gelberg Andersen and Leake, 2002). In current versions of the model domains specific to vulnerable populations such as psychosocial histories have been integrated to the broad domains that have characterized previous iterations.

Since the inception of the ABM, various authors have adapted and modified the model in order to analyze the service utilization patterns of emerging populations (Andersen, 1995; Gelberg et al., 2001; Egorin, 2004). However, in all revisions of the model, the ABM has maintained three conceptually different factors that bear theoretically on health care seeking behavior: (1) predisposing factors such as gender, age and ethnicity; (2) enabling factors such as health insurance and income and (3) need or the perception of need for a service. Each of these will be described in the sections below.

Predisposing Factors

Predisposing factors for service use are individual in nature and include basic demographic characteristics, social structural constructs and health related beliefs. Anderson (1995) considered characteristics such as age and gender to impact the

equitable distribution of health services. A recent study of the correlates of VCT also considered nativity as a demographic measure (Do, Hudes, Procter, Han & Choi, 2006). Another component of predisposing factors are social structural measures which are constructs that relate to an individuals status within the community and his or her ability to obtain resources to cope with problems (Andersen, 1995). Social structure characteristics that have generally been considered to be related to patterns of health care usage include race, ethnicity, education, occupation, family size and residential mobility. These population characteristics have remained unchanged in most subsequent revisions of the model (Aday and Andersen 1974; 1981; Andersen, 1995; Andersen and Aday, 1978; Andersen, 1983; Andersen and Newman, 1973) although the measurement methods have evolved. Andersen has stated that although social structural variables were initially intended to be measured at the family level, due to measurement difficulties (1973) they gradually became individual level variables. Andersen (1995) has subsequently suggested that measures of culture also constitute social structural variables and should be included in predisposing factors. Honda (2004) and Chaudhry, Fink, Gelberg & Brook (2003) included uni-dimensional measures of acculturation under this dimension of the model. These linguistic measures of acculturation are most common proxy for acculturation in many studies (Ruggiero and Yang, 2006; Pérez-Escamilla & Putnik, 2007). Hagewan (2006), utilizing the same language proxy, argued that acculturation integrates well in this predisposing component because it reflects an individuals status in society. By contrast, she also felt that acculturation could be an enabling factor because it permits for the satisfaction of a health service need. To resolve this incongruity, she chose to create an independent acculturation category for

acculturation between predisposing and enabling. For this study, the layer of complexity added through the use of a multi-dimensional measure of acculturation required that such categorization such be revisited. Inspection of the questions that comprised the multi-dimensional scale found that the questions measured individual differences regarding "place in community" so acculturation was conceptualized as a predisposing factor.

Andersen also includes belief as a predisposing factor that influences service use. Health beliefs relate to health knowledge, comprehension of the health care system, and patients' understanding of their health care options (Andersen, 1995). Further discussing the evolution of the ABM from general to specific uses, Andersen stated, "If we examine beliefs about a particular disease, measure need associated with that disease and observe the services received to deal specifically with the disease the relationships will probably be much stronger than if we try to related general health beliefs to global measures of need and a summary measure of all services received" (1995, p.2).

Enabling Characteristics

Health care in the United States is neither free nor unrestricted. Most health care is restricted to individuals who are able to pay, buy health insurance or who have health care options provided by their employer. Moreover and increasingly, having a regular provider is important to receive basic health care services including testing. Regular providers may identify and approve VCT and other services, and serve both as an access point to the health care system and a gatekeeper. Andersen suggested that income, health insurance and a regular source of health care enable patients to gain access to traditional services (Andersen et al., 1975). Although it is understood that some Latina women also seek alternative sources of medical care, limitations may persist in the accessibility of

traditional sources of care due to low socioeconomic status, as noted earlier. Despite this burgeoning area of interest, the ABM has not yet been applied to alternative sources of care.

Need

It stands to reason that some level of need has to be perceived by both patient and provider for them to seek health care services such as VCT. Perceived need generally consists of the experience of disease or risk factors and can include such issues as overall health status. This may include a measure of need, evaluated illness, a diagnosis, or symptoms identified by a health care provider. In their original study, Andersen and Newman (1973) found that need, was the strongest predictor of all types of service use including hospital, physician and dental visits. They also found that predisposing and enabling categories generally had low relative importance in the utilization of these services. Although the health care landscape has changed during the past thirty three years many studies still find that need mediates the influence of predisposing and enabling factors on service use (Stiffman et al., 2001).

Despite their role as the first and often only interaction for a vulnerable patient within a health care system, primary care providers often do not accurately perceive patient needs (Stiffman et al., 2001; Taira et al., 1997) which can be a determinant of service access (Stiffman et al., 2000). Although such measures can be difficult to conceptualize during research design, the reduction of health disparities requires that we understand both the influences on service use and the gap between need and access (Stiffman et al., 2001). Although many studies of service use typically use only

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individual level variables, the ABM could be strengthened when provider data is included.

Health Service Utilization

The centerpiece of HIV prevention initiatives is the HIV test. A variety of outreach programs are designed to encourage people to learn their sero-status through VCT. Despite this practice focus, most research has only identified VCT as a predictor of decreased risky sexual behavior. VCT is generally used as a predictor variable due to the strong belief among many HIV researchers and practitioners that VCT significantly contributes to lowered risk behavior for many people who receive it. Specific behavioral skills such as condom negotiation have been found to effectively counter risk behaviors and are included in the counseling component of VCT. Federal guidelines have required such pre and post testing counseling for the acquisition of an HIV test for many years (CDC, 1993, 2001; 2006). Nevertheless, there is some evidence that VCT is not an effective intervention for the primary prevention of HIV infection (Weinhardt, Carey, Johnson, & Bickham, 1999; Sweat, 2006) so its role in such efforts may be questioned. For example, a meta-analysis of 27 VCT studies found that those that tested HIV positive reduced risky sexual behavior such as unprotected sex and increased condom use after VCT; while those whose results were negative did not modify their behavior more than untested participants (Marks et al, 2005; Weinhardt et al, 1999).

Furthermore, the CDC recently issued national testing guidelines that strongly suggested that VCT be solely utilized as a diagnostic procedure instead of an educational intervention (Branson et al., 2006). Such guidance stated that the current counseling requirement for VCT should be eliminated because VCT should be approached as a

medical test. Since previous studies of preventative health service utilization have used medical tests such as mammographies for breast cancer (Laws and Mayo, 2002) or tests that detect ovarian cancer (Sox, 1998) as dependent variables, considering VCT as such an outcome variable is warranted. Despite these considerations, VCT has not generally been used as an outcome measure (Sweat, 2006). This dissertation study suggests that considering VCT as a medical procedure justifies the application of the ABM.

Alternate Theoretical Approaches

While the ABM is the most widely used tool for predicting and explaining health services use, it is not the only model. Economic demand models attempt to explain service utilization questions by classifying lack of use as a problem of consumer satisfaction (Grossman, 1972). Although prevalent in the economic literature (Sindelar, 1982), this approach is seen less often in health services primarily because health service use is generally considered to be driven by a more complex set of variables and relationships than merely satisfaction (Shea & Miles, 1996). Although, there is a little evidence that VCT is driven by consumer satisfaction there are elements of the economic demand approach in the ABM in the enabling domain, as noted by Emlet (1998), and in the discussion above. Due to the more comprehensive approach and the inclusion of multiple factors leading to health care utilization, the ABM was considered a better fit for this study than the examination of economic factors alone.

The Health Belief Model (HBM) has also been extensively utilized to predict sexual risk behaviors in HIV research. The HBM suggests that individuals engage in health promotion behaviors when they perceive a threat or believe that their action will

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prevent poor health (Rosenstock, 1966). Threat is considered the perception of risk of contracting an illness in relation to the perceived seriousness of the disease. Some versions of ABM include HBM variables under the heading of "perceived need." However, as with economic approaches, the HBM is a more limited and less comprehensive theoretical approach to the study of health care utilization. ABM was chosen instead of the HBM for this study because the latter does not capture factors other than health beliefs that may be important to testing. Furthermore, as will be noted in the following chapter, available data did not allow for as much study of health beliefs as might ultimately be desired. This also suggested the use of a more multidimensional theoretical approach such as the ABM.

Although the ABM was considered the best available theoretical framework for this study it is not without some problems. Throughout the decades of research utilizing the ABM, questions about whether the model sufficiently addresses psychosocial determinants of health, including culture (Andersen, 1995); social factors (Guendelman, 1991); psychological characteristics (Aday, 2001) and provider characteristics (Phillips, Morrison, Andersen, & Aday, 1998) have arisen. Some researchers have suggested that failure to add such factors to the ABM may contribute to the low predictive validity of ABM found in some previous studies (Bazargan & Bazargan, 1998; Keith & Jones, 1990; LaVeist & Keith, 1995). The following section suggests adaptations of the ABM to address these issues.
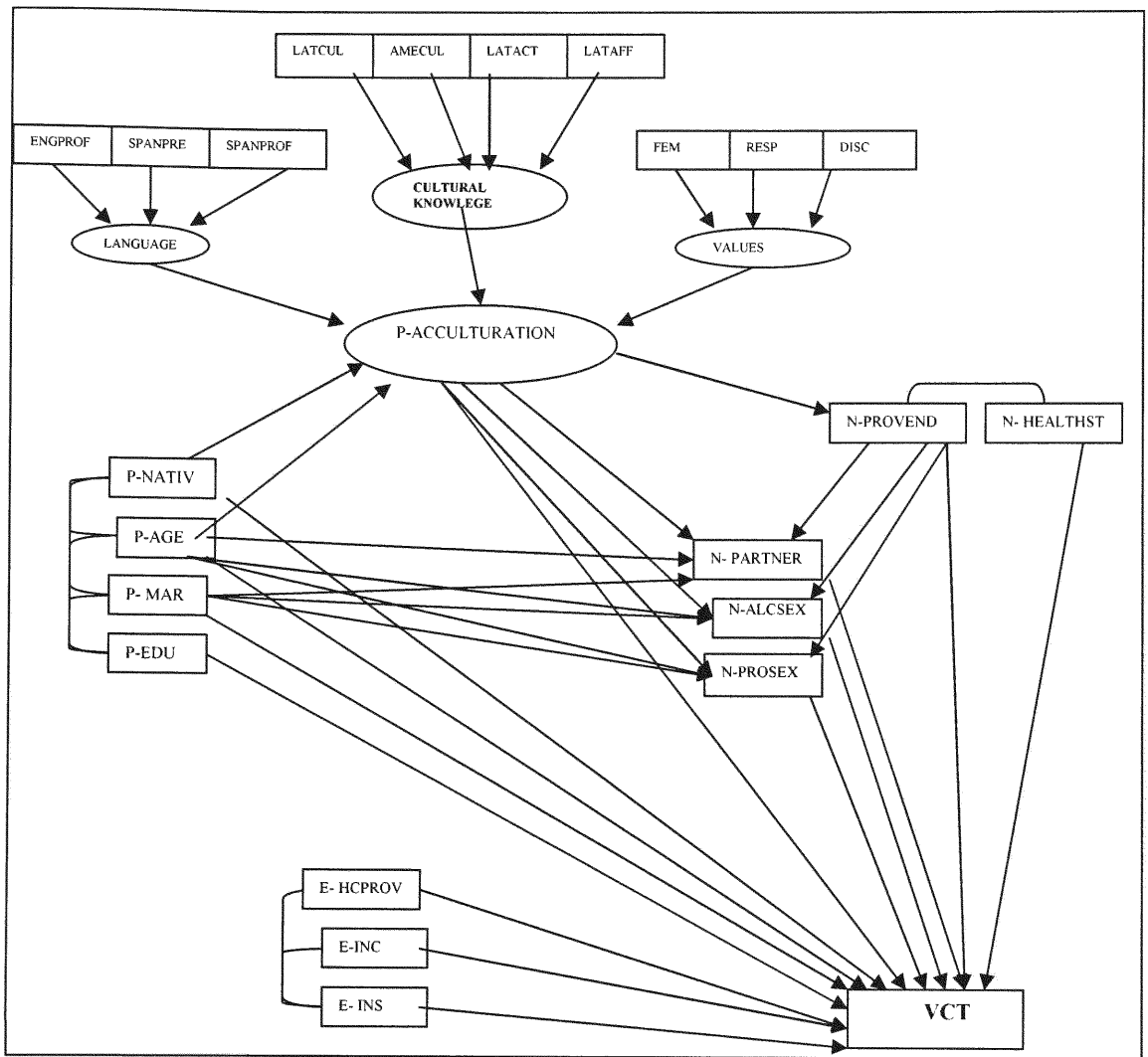
Figure 2. Proposed Model of the Correlates of VCT for Older Latinas

Notes: SPANPREF =Spanish Preference; SPANPROF =Spanish Proficiency, ENGPROF = English Proficiency; LATCULT=Latin Culture; LATAFF= Latin Affiliation; LATACT=Latin Activism; AMERCULT= American Culture; RESP=Respeto; FEMIN=Feminism; DISCRIM =Discrimination. AGE=Age; EDU=Education; MARITAL=Marital: INC= Income; HCPROV = Regular source of healthcare, INS= Health insurance, PROVEND= Provider Endorsement, HEALTHST=Health Status; ALCSEX= Alcohol consumption during sexual activity, PARTNER =number of sexual partners during the past 12 months, PROSEX = Percent of protected sex, VCT= Voluntary Counseling and Testing. Rectangles represent observed (measured) variables. The straight lines with arrows from observed variables represent presumed causal pathways. The values along the pathways are path coefficients. All exogenous variables are assumed to be correlated.

Adapted Andersen Behavioral Model

Several cultural and provider factors were added to the model in an attempt to strengthen the predictive ability of the ABM for middle age and older Latinas. These changes included: 1) a multi-dimensional measure of acculturation; 2) provider characteristics such as endorsement and type of health care; and 3) conceptualizing VCT as an outcome variable of service use instead of a predictor of sexual risk. This adaptation (Figure 2) builds on the earlier modifications for vulnerable populations posited by Gelberg et al. (2000) and Andersen (1995) and includes relationship that the literature suggests may be particularly important to VCT for middle aged and older Latinas. The central feature of this model is the sequential links between the predisposing, enabling and need factor related variables to the outcome variable of VCT.

According to Andersen (1968; 1995), predisposing characteristics consist of demographic, social structural and health belief variables. Since gender is already criteria for study inclusion, age and nativity were included under this domain. As social structural factors indicate both status in community and the ability to cope with problems, Andersen has suggested that measures of culture be included along with education and marital status in this area. For this study, these cultural social structural variables included a multi-dimensional measure of acculturation. In addition to suspected influences individually on the dependent variable of VCT, some inter-variable relationships may exist. Marital status is thought to have a relationship with sexual risk factors as married women generally have fewer sexual risk factors (Bowleg et al., 2000). Age and sexual risk factors are expected to have a relationship as older women often have fewer sexual risk factors (Goodroad, 2003).

A relationship is also suggested between acculturation and sexual risk factors. Although not studied in older women, generally Latinas that are less acculturated have fewer sexual partners (Sabogal, Perez-Stable, & Otero-Sabogal, 1995). Based on previous findings that state older women are often considered to be more traditional than their younger counterparts, (Salabarria-Pena et al., 2003), age and acculturation may be related. The three latent domains of acculturation and nativity are also expected to impact the latent variable of acculturation (Felix-Ortiz, 1994).

Health beliefs are an indicator of predisposing factors in the original model. Unfortunately, as will be discussed in the following chapter, it was not possible to include health beliefs in the model in the current study since they were not collected in the parent study. The data did support the use of most of the important factors in the ABM, and is still considered quite robust, but the inability to include health beliefs is a limitation of the study.

Enabling factors have been measured in previous ABM studies as income, a regular provider of health care and health insurance (Bradley, McGraw, Curry, Buckser, King, Kasl, Anderson et al, 2000 & Andersen, 2005). These variables were included in the current adaptation and are expected to impact VCT directly while having some relationship with one another.

Need, which includes measures of current health status and perceived need for a service, has been considered to be important to help seeking. This can include engagement in practices that lead individuals or providers to perceive that a service is needed. Since some studies have found that there may be a relationship between sexual risk factors and VCT, (Bond et al., 2005; Reiss et al., 2001), such measures were added to

the adapted model. Provider endorsement was included in this adapted model because providers' endorsement of VCT provides aspect of the perception of need (Fernandez et al., 2004). Measures of self reported health status are included because both the ABM and VCT literature have indicated a relationship to VCT (Kakoko, Lugoe & Lie, 2006). Relationships may also exist between provider endorsement and age as the literature indicates that some health care providers may be reluctant to discuss sexual risk factors or VCT with older women (Stout et al., 2002). Provider endorsement and acculturation may also be related, particularly with regard to the construct of respeto that refers to deference to those in authority.

VCT is the outcome measure of service utilization included in this adaptation. This is in keeping with Andersen's recommendation that measurements of service use avoid general use, such as emergency care center visits and target a specific health need such as HIV. Although in many studies, VCT has been considered a predictor of behavioral change and not an outcome variable, for this study, VCT is conceptualized as measure of service use. This adaptation includes VCT in the ABM framework because sexual risk behaviors are neither measures of service utilization nor the primary areas of interest.

Conclusion

VCT of middle aged and older Latinas has never been investigated in a research study. The primary objective of this study is to develop and test a multivariate model of such VCT. The most promising theoretical model available for guiding this research due to the complexity of the multiple relationships between the variables is the ABM. Several constructs hitherto unstudied in this population have also been identified for inclusion in

the model. Overall, it is expected that the data will fit the proposed pathway model (Figure 2). Additionally, the following specific hypotheses for the proposed model are being delineated based on the three classes of variables shown in the model diagram.

Research Aims

Aim 1- Develop and empirically test a multivariate model of VCT utilization for middle aged and older Latinas. Additionally, the following specific hypotheses for the proposed model are delineated based on the variables emphasized in the literature.

Hypothesis 1.1). Acculturation will be a stronger predictor of VCT than self perceived health status for middle aged and older Latinas.

Hypothesis 1.2). Provider endorsement will have a significant impact on VCT for middle aged and older Latinas.

Hypothesis 1.3). Sexual risk factors will predict VCT for middle age and older Latinas.

Hypothesis 1.4). Age will have a negative impact on VCT for middle aged and older Latinas.

Hypothesis 1.5). Middle aged and older Latinas are more likely to have been tested for HIV at a physician's office than at any other location.

Aim 2 – To test how the three individual components of the Andersen Behavioral Model impact VCT for middle aged and older Latinas.

Hypothesis 2.1). Predisposing factors (age, cultural identity, education) will have a stronger impact on VCT among older Latinas than enabling characteristics (income, health insurance) or need (sexual risk factors, provider endorsement). Hypothesis 2.2). Among predisposing factors, social structural components (cultural identity, education) will have a stronger impact on VCT than the other variables (age, nativity).

Chapter III

Methods

This study utilized a structural equation model (SEM) and regression approaches with secondary data to explore factors associated with HIV testing for older Latinas. A review of the literature suggested fourteen variables that may have an influential relationship on VCT. This chapter will provide a detailed description of data collection, measurement strategies and the analytical approaches.

Sampling Procedure

The sample for this dissertation consisted of 135 Latinas age 45 and older who were interviewed for the Women's Study the Center for Latino Drug Abuse Research (CRUSADA) located at Florida International University (FIU). Data for the analysis is from the Inter-Generational Transmission of Drug Use between Latina Mothers and Daughters Study conducted in Miami Dade County, Florida. The primary objective of the original study is to identify the risk and protective factors that influence the intergenerational transmission of drug-using behaviors between Latina mothers and daughters. The study has been funded by the National Institute of Drug Abuse, National Institutes of Health (NIDA-5R24DA014260--01A1).

Although this study constituted a secondary analysis, a brief discussion of the Women's Study procedures does provide context. The study included 160 Latina mother/ daughter dyads within each of the four categories (n=320): (1) drug-using mothers and daughters; (2) drug-using mothers and non-using daughters; (3) non-using mothers and drug-using daughters; and (4) non-using mothers and daughters. They were recruited between October 2004 and October 2006 by using convenience and snowball sampling

(chain referral) methods. Study inclusion required that participants: 1) were Latina; 2) over age 18; 3) gave consent to be interviewed with either their mother or daughters; 4) residents of Miami-Dade County. Exclusion criteria included males and children as well as members of other ethnic groups.

Participant recruitment strategies varied. They included using advertisements in local newspapers (i.e., Miami New Times) and radio stations (i.e., Radio Paz and Radio Caracol), participating in community health fairs, and conducting outreach to agencies and networks that serve the Latina population (i.e., substance abuse treatment centers, local health clinics, the Miami-Dade Drug Court, Narcotics Anonymous and Alcoholics Anonymous). This study utilized an ethnographical approach and indigenous researchers familiar with the communities in which participants resided.

Data Collection Procedures

Potential participants were initially screened for eligibility over the telephone. Interviews were conducted with study participants either in Spanish or English using a structured questionnaire, which collected information about participants' attachment to their mothers/daughters, drug use behavior, sexual behavior as well as risk and protective factors. Bilingual interviewers completed each interview with either the mother or daughter in 2-3 hours. The interviews took place at Florida International University, offices of community based organizations, the participants' homes, or in other locations convenient to participants (e. g., parks). Participants received $40 cash at the completion of the interview.

Human Participants Consideration

All study methods for the study were approved by the Institutional Review Board (IRB) at Florida International University. Participants completed an informed consent form, which specified that they could terminate their participation at any time. The questions were read aloud by the interviewer to ensure that those participants who had reading difficulties could successfully complete the instrument. During the interviews there was some discussion about sensitive issues such as sexuality and HIV risk but interviewers were trained to build rapport and make referrals as needed.

Interview materials were recorded without names to protect confidentiality. Completed surveys were kept locked with no ability for access except to the principal investigator. Data from the interviews was entered in an Access database by two monolingual and three bi-lingual researchers in the language in which the interviews were done. The database was then exported to the SPSS version 14 as string values and converted to numeric values using a syntax created from a code book. For internal validity purposes, 10 percent of interviews entered by each researcher were selected using the Excel random number selection formula, re-entered by another researcher, and analyzed for discrepancies. Homogeneity among the double entered cases was more than 99 percent among all the cases re-entered. Once these steps were completed, Florida International University's Institutional Review Board (IRB) approved the procedures for this dissertation before research commenced (Approval # 080905-00).

Measures

A total of fourteen pertinent variables collected in the original study (Table 1) were used. Using the framework of the ABM, particular measures were grouped in either predisposing characteristics, enabling characteristics and need as the primary influences of health service utilization. All of the variables under investigation were part of the original Women's Study which used a combination of closed ended, open ended and Likert type questions. No new measures were utilized for this secondary analysis.

Table 1.

Description of Measures

Variable	Andersen Domain	Levels of Measurement
1. Age	Predisposing	Continuous, # of years
2. Marital status	Predisposing	Nominal (married, single, divorced, widowed)
3. Education	Predisposing	Ordinal (<high school; high school; bachelors degree; graduate/professional studies)
4. Nativity	Predisposing	Dichotomous, US-born, foreign born
5. Cultural Identity	Predisposing	Continuous (Scores for each subscale)
6. Income	Enabling	Continuous
7. Regular provider of health care	Enabling	Nominal (no regular health care, community clinic, private doctor, community clinic).
8. Health Insurance	Enabling	Dichotomous (no, yes)
9. Health Status	Need	Ordinal (excellent, very good, good, fair, poor)
10. Provider Endorsement	Need	Dichotomous(yes, no)
11. Alcohol use before or during sex	Need	Ordinal (always, frequently, sometimes, occasionally, never)
12. Number of Sexual Partners	Need	Continuous
13. Percentage of condom use	Need	Continuous
14. Endogenous Measure: HIV Testing	Service Utilization	Dichotomous (yes, no)
15. Location of HIV Test	Service Utilization	Nominal (no test, community clinic, private doctor, hospital).

Independent Variables: Predisposing Variables

Predisposing variables were operationally defined by age, marital status, education, nativity and the Cultural Identity Scale. Participants reported their age (in years), marital status (collapsed into never married=0, married, including common-law and remarried=1; and divorced, which includes separated and widowed=2). Education was collapsed into: (less than high school=0, high school=1; bachelor's degree or above=2). Nativity was dichotomized into two variables (US-born=0 or foreign born=1).

Cultural Identity

Cultural identity was identified through the Cultural Identity Scale (Latina (o) Acculturation Scale). This 35 item instrument provides multidimensional profiles of cultural identity. This acculturation scale has been used in a variety of studies, most frequently in those that assess the impact of culture on risk behaviors among Latinos (Felix-Ortiz, Newcomb, & Myers, 1994; Felix-Ortiz & Newcomb, 1999; Felix-Ortiz, Vela'zquez, Medina-Mora, & Newcomb, 2001). One of the most compelling features of the scale is that is strives to capture several the complexity of cultural identity though the use of multiple measures instead of utilizing a single proxy indicator such as language preference. Furthermore, the scale recognizes the possibility of bi-cultural respondents. Although this acculturation measure has been utilized in several studies, the scores have not been standardized with a national population. Thus, the distribution of the data determines how responses are scored relative to the other responses within a sample (Felix-Ortiz et al., 1994).

The individual items were totaled into ten subscales and organized into the three domains conceptualized by the author: Language (Spanish proficiency, English

proficiency, Language preference), Cultural Knowledge (Latin culture, American Culture, Latin affiliation, Latin activism) and Values (respeto, feminism, discrimination) (Felix-Ortiz, Newcomb, & Meyers, 1994). Four subscales (respeto, Latin activism, Latin affiliation, discrimination) were reverse scored so that high scores indicate a greater amount of each experience to create uniform result interpretation.

In the original study of adolescent Latinas, the reliability coefficients of the subscales ranged from .69 to .91 with .81 as the average reliability of all scores. The largest coefficients were found for the language scales (.87-.91) while the values scales (.72-.81) were comparable to those for cultural knowledge measures. For this study reliabilities were conducted on all of the subscales and compared with the findings in the original study (Table 2).

Table 2.

Comparison of Reliability Coefficients for Cultural Identity Subscales

Cultural Identity Scales	Number of Items	Women's Study (*n*=320) Standardized Alpha Coefficients	Original Study (Felix-Ortiz, Newcomb & Myers, 1994) (*n*=130) Standardized Alpha Coefficients
Language Scales			
Spanish Proficiency	4	.80	.88
Spanish Preference	4	.92	.87
English Proficiency	3	.96	.91
Cultural Knowledge/ Behavior Scales			
Latin Culture	4	.80	.69
American Culture	4	.79	.77
Latin Affiliation	4	.73	.89
Latin Activism	3	.40	.79
Values/ Attitudes Scales			
Perceived Discrimination	3	.72	.72
Respeto	3	.63	.77
Feminism	3	.71	.81

Preliminary Analysis

Due to the complexity of the proposed model (Fig. 2), and the large number of observed variables included, and a desire to preserve the multidimensional nature of the measure, preliminary analyses of the Acculturation Scale were conducted using SEM techniques. Factor structures and relevant pathways were explored. These were composed of a higher order factor analysis, a confirmatory factor analysis and a logistic regression.

A higher order factor analysis using the higher order latent variable of acculturation, the latent variables of language and values (each with three indicators) and cultural knowledge (with four indicators) was attempted. However, this model could not converge indicating that all of these factors together did not account for the latent variable of acculturation. Next a confirmatory factor analysis was conducted by modifying the first model and removing the higher order latent variable of acculturation. The latent variables of language, cultural knowledge and values with the associated indicator were preserved. Good fit indices could not be obtained for this type of factor structure. Based on inspection of the correlation matrix and the relationship of these measures with other constructs as well as the bi-cultural nature of acculturation that does not allow for the generation of a total score to determine level of acculturation, it was decided to use each of the ten subscales (composed of a total score) as a single variable for each distinct construct of cultural identity (i.e., Spanish preference, respeto, Latin affiliation). Furthermore, the impact of the various components of acculturation on the dependent variable was of primary interest. Therefore the ten subscales were assessed through the utilization of logistic regression in an SEM framework which allowed for the

selection of only those subscales that had a significant predictive value to the study's main focus of VCT. The results of those analyses are illustrated in Table 3. Reasonably good model fit was found wherein the x^2 (36, $p = > .320) = 1.095$; x^2/DF = .0370; CFI = .990; RMSEA < .027 with a p-value of close fit of .778. Additional focused fit indices were examined and no modification indices or no offending estimates were found. Standardized residuals were less than two. The logistic regression on the dependent variable of VCT identified only one significant predictor of discrimination (OR=1.20; p=.007). The subscale of discrimination referred to the participant's general experiences of discrimination related to ethnicity (i.e. "I have gotten poor service because of Latino identity"). Although not statistically significant, Spanish proficiency (OR=1.044; p=.370) was also retained for further analysis. This is due to the vast body of literature that identifies language as a proxy measure of acculturation. Finally the subscale of respeto (OR=.931; p=.320) although not statistically significant was retained for theoretical purposes. Following the empirical examination of the results it was noted that the subscales of Spanish proficiency and discrimination also made good theoretical sense so they were chosen to represent acculturation for the full model analysis.

Table 3.

Cultural Identity Subscale Coefficients

Path Description	Path Coefficient	Standard Coefficient	Standard Error	Critical Ratio	ODDS Ratio
Language Subscales					
SPANPROF to VCT	.009	.139	.010	1.897	1.044
SPANPREF to VCT	-.014	-.072	.023	-.596	.939
ENGPROF to VCT	-.007	-.045	.024	-.298	.968
Cultural Knowledge Subscales					
LATCULT to VCT	.016	.095	.019	.826	1.072
LATAFF to VCT	-.014	-.094	.021	-1.119	.895
LATACTIV to VCT	-.010	-.100	.026	1.217	1.153

AMERCULT to VCT	.012	-.057	.020	-.501	.957
Values					
RESPETO to VCT	-.017	-.088	.016	-1.050	.931
FEMIN to VCT	-.014	-.066	.018	-.778	.944
DISCRIM to VCT	.038	.222	.014	2.699**	1.189

Note: VCT = Voluntary Counseling and Testing, SPANPREF =Spanish Preference; SPANPROF =Spanish Proficiency, ENGPROF = English Proficiency; LATCULT=Latin Culture; LATAFF= Latin Affiliation; LATACT=Latin Activism; AMERCULT= American Culture; RESPETO=Respeto; FEMIN=Feminism; DISCRIM =Discrimination.
* $p < .05$. ** $p < .001$.

Independent Variables: Enabling Characteristics

Enabling variables include: annual income ($0-$4,999=1; $5,000-$9,999=2; $10,000-$14,999=3; $15,000-$19,999=4; $20,000-$24,999=5; $25,000-$29,999-6; more than $30,000=7), usual source of health care (responses to an open-ended question were collapsed into no regular health care=0; community clinic=1, private doctor=2, community clinic=3), and health insurance status (no insurance=0, has insurance=1). Determination of the presence of provider endorsement will be evaluated by response to the question, "Has your doctor or any health professional spoken to you about HIV prevention or safe sex in the past 12 months?" (no= 0 or yes=1).

Independent Variables: Need

Need was operationally defined using a modified version of a Sexual Activity Questionnaire used to measure sexual risk factors. This scale has been utilized to gather information on participants sexual risk behaviors including frequency and type of sexual acts, substance use prior or during sex, and sexually transmitted diseases (STDs) (Turner & Gil, 2002). For the purpose of this study three indices of sexual risk were used to indicate exposure to HIV. These items were chosen because they are frequently utilized to evaluate HIV risk (Pinkerton et al., 1998; Tubman, Gil, Wagner, & Artigues, 2003).

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Participants reported: 1) Total number of sex partners "How many different people including women and men have you had sex (vaginal, anal, and oral) with during the past twelve months?; 2) Frequency of alcohol use during sex (always, frequently, sometimes, occasionally, never); 3) Total number of incidences of vaginal sex; oral sex and anal sex during the past twelve months and the number of acts that included the use of a condom. To obtain proportions of protected acts, the number of protected vaginal sexual acts was divided by total number of acts. Due to few reports of either anal sex or the use of a condom during oral sex these two variables were dropped from the analysis. The literature has found that more precise measurement of risk behaviors such as specific questions about the number of sexual partners or substance use have found to be much stronger indicators of VCT than general risk assessments (Anderson, Wilson, Doll, Jones, & Barker, 1999).

Outcome Variable: HIV Testing

Participants were asked whether they have been tested for HIV (no=0, yes=1). If the participants answered "no", they were asked why they have not been tested. If they answered "yes" they were also asked the physical location of their last HIV test. These open ended questions were collapsed into (no test=0, community clinic=1, private doctor=3, hospital=2).

Data Analysis

Structural Equation Modeling

Structural Equation Modeling (SEM) was utilized to analyze the explicitly testable model. SEM is a set of statistical procedures that permit the examination of an assortment of relationships between one or more continuous or discrete independent

variables (IV's) and dependent variables (DV) (Hagewen, 2005) Such a multivariate approach consolidates the specific aims and hypothesis in a multilevel analytical approach. In the SEM analysis, path diagrams in a conceptual model of hypothetical relationships define the relevant linear equations (Jaccard, 2001). Since the Andersen Behavioral Model integrates the complex determinants of health service utilization (Ullman, 2001), SEM has been suggested as a strong analytic approach to test this model because it allows for the simultaneous testing of the complex relationships seen in social science research (Phillips, Morrison, Andersen, & Aday, 2000). Furthermore, Bradley, McGraw, Curry, Buckser, King, Kasl, and Andersen (2002) suggest that the relationships between such factors as ethnicity or cultural identity could be best investigated through such a method. This approach is an integrated test of a model whose coefficients reflects the predicted set of relationships. Unlike multiple regression, SEM can account for both measurement error and error correlations, as well as interactions, nonlinearities, latent variables and correlated independents, and multiple indicators. SEM also has more flexible assumptions and allows for simultaneous testing of measurement models and predictive models with multiple indicators and across multiple group solutions. Because of these abilities, SEM has been considered a more powerful alternative to such techniques as multiple regression, path analysis or factor analysis individually by incorporating elements of these approaches.

SEM is often used in model development as it integrates both exploratory and confirmatory functions. Initial models are posited, deficiencies are evaluated and then alternative models are tested to identify the model with the best fit. A structural model is a gathering of exogenous and endogenous variables as well as their error terms and the

hypothesized paths between each of them (Bollen and Long, 1993). SEM includes observed variables as well as latent variables. Once a model has been specified, the free parameters are estimated from the observed data and each unique solution is created from the variances and covariances of the observed variables. Once all unknown parameters are known, the model becomes identified (Bollen and Long, 1989). Data will be cleaned and organized during the process of preparation, descriptive statistics and bivariate analysis will provide an overview of the data and finally models and hypotheses will be tested using SEM. SPSS, AMOS 6.0, Amelia2 and MPlus software packages will facilitate data analysis.

Logistic Regression

Once the preliminary issues such as missing data, outliers and non- normality have been resolved, descriptive analysis such as frequency counts will be conducted that describe the characteristics of the study sample. Next bivariate correlations will be examined using Pearson's correlation coefficient to assess for excessive collinearity between variables. The Andersen Behavioral Model will be used to guide the analyses to determine what factors are associated with VCT. To test the hypothesis with a discrete outcome variable, logistic regression in a SEM framework will be used to determine the influence of factors on testing relative to the model. Logistic regression is a generalized linear model that uses a logarithm of the odds (which is the probability divided by one minus the probability) of the outcome and is modeled as a linear function of the independent variables (Hosmer & Lemeshow, 1989). The odds of an event is defined as the ratio of the probability that an event occurs to the probability that it fails to occur. Odds ratios will be created to determine the likelihood of Odds ratio (getting tested) =f=

(PF+EC+ N). Thus, Odds(indicator=1) = Pr(indicator=1) / [1 − Pr (indicator=1)] or

Odds(indicator=1) = Pr(indicator=1) / Pr(indicator=0). The log odds are just the (natural)

logarithm of the odds (Hosmer & Lemeshow, 2000).

$$\log it(p_i) = In(\tfrac{p_i}{1-p_i}) = \alpha + \beta_1 \chi_1, t + ... + \beta_\kappa \chi_\kappa, t$$
$$t = 1,..., n,$$

Criteria for rejecting the null hypothesis: The null hypothesis, which suggests that the

observation is due to random chance events, will be rejected if p values of less than .05

are found.

Methodological Limitations

Several methodological limitations should be noted. Sensitive issues such as

sexual behaviors are not verifiable through any other means other than subject self report.

Despite this challenge, the extensive training of the interviewers enabled rapport building

in a quest to elicit truthful responses. It would be helpful to have other sources of data to

ensure the accuracy of responses. Furthermore, most of the measures collected for the

primary study and thus part of this secondary analysis were single indicators. It would be

extremely beneficial to have additional variables to ensure accurate capture of constructs.

Reliance on single indicators can create some problems in replication and make findings

even more sample dependent.

Chapter IV

Results

Introduction

The purpose of this chapter is to describe the findings for all variables included in the research as well as the overall model. The sample for this dissertation consisted of all of the Women's Study participants who were age 45 or older (n=135). Descriptive statistics for all the variables analyzed in this study are provided in Table 3. Pearson correlations for all variables are provided in Table 2. Finally, the results of the structural equation model predicting VCT are described and related to the appropriate hypothesis.

Descriptive Statistics

Frequency counts were conducted within levels of each ordinal or categorical variable to determine what logistic regressions models could be tested. In the situations where the 20% of cells had frequencies < 5, and thereby prevented an appropriate test of a model, an approach was used to seek alternative tests of the model. Appropriate cell frequencies were achieved by combining adjacent levels of a variable (e.g., level of income or level of education) in a fashion that sustained the logic of the hypothesis under study, and then the combination of adjacent levels was performed.

The next analytic step included generating descriptive statistics, including standard deviations, means, skewness and kurtosis for all variables. Although full descriptive statistics are noted in Table 4 selected highlights are briefly discussed. Participant ages ranged from 45 to 88 ($M = 55.32$, $SD = 8.15$) with the vast majority born outside the United States (86.7%). These older Latinas were divorced, separated or widowed (63.7%) with minimal education of either less than high school (27.4%) or high

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school graduate (24.4%). For the most part, participants had very low incomes of less than $15,000 per year (64.5%). A private doctor was cited as their regular source of healthcare most frequently (44.4%) while slightly more than half of the participants reported having health insurance (54.1%).

The number of sexual partners during the past twelve months ranged from 0-7 (*M* =.98, *SD* = .958). The majority of respondents reported having one sexual partner during the past twelve months (63%) and not using alcohol during sexual activity (73.3%). Most participants reported their health status as good (37.8%) or fair (23%). Slightly more than half stated that a provider had not endorsed VCT (57%). A surprising majority (60.7%) of older Latinas had gotten VCT. Of those that had received VCT, most had been tested at a clinic (65.5%).

Table 4.

Descriptive Statistics

Variable	*n*	%	M	SD	Skewness	Kurtosis
Predisposing [1]						
Age			55.32	8.15	1.14	1.45
45-54	73	54.1				
55-64	44	32.6				
65+	18	13.3				
Marital Status						
Never been married	7	5.2				
Married or common-law	42	31.1				
Divorced, Widowed, Separated	86	63.7				
Education						
Less than high school	37	27.4				
High school graduate	33	24.4				
Some post high school	32	23.7				
College graduate +	33	24.4				
Acculturation						
Spanish Proficiency	135		14.32	2.59	-1.12	1.06

	N	%				
Spanish Preference	135		35.35	7.88	-.68	-.24
English Proficiency	135		8.20	3.15	-.28	-1.19
Latin Culture	135		11.81	3.04	-6.05	-.57
Latin Affiliation	135		9.75	1.94	-.31	-1.28
Latin Activism	135		1	1	1.16	.70
			1.22	.75		
American Culture	135		9.16	2.83	.17	-.34
Respeto	135		9.52	2.63	.22	-.41
Discrimination	135		7.21	2.92	.49	-.30
Feminism	135		12.87	2.33	-1.41	2.56

Nativity
	N	%
United States (US)	18	13.3
Outside US	117	86.7

Enabling
	N	%
Income	135	
$0-$4,999	34	25.2
$5,000-$9,999	29	21.5
$10,000 –$14,999	24	17.8
$15,000-$19,999	13	9.6
$20,000-$24,999	7	5.2
$25,000-$29,999	12	8.9
more than $30-000	16	11.9

Regular Source of HC	N	%
no source of care	6	4.4
Clinic	31	23.0
Hospital	38	28.1
private doctor	60	44.4
Health Insurance		
No	62	45.9
Yes	73	54.1

Need

Sexual Risk Factors

	N	%				
Safe Sex (% of protected)			.53	.48	-.12	-1.95
Sexual Partners			.98	.96	2.32	8.08
0	35	25.9				
1	85	63.0				
2	5	3.7				
3	6	4.4				
4 +	4	2.9				
Alcohol consumption			4.44	1.07	-1.95	2.96
Always	6	4.4				
Usually	3	2.2				
Sometimes	16	11.8				
Rarely	11	8.1				
Never	99	73.3				
Health Status			3.01	1.12	.10	-.57
Poor	12	8.9				
Fair	31	23.0				

Good	51	37.8				
Very good	25	18.5				
Excellent	16	11.9				
Provider endorsement			.43	.50	.29	1.95
No	77	57.0				
Yes	58	43.0				

Health Service Utilization						
VCT			.61	.49	-.45	-1.83
Yes	82	60.7				
No	53	39.3				

Location of VCT						
Clinic	53	65.5	.87	.893	.826	-.051
Hospital	19	23.4				
Private doctor	9	11.1				

1 These variables are left in their continuous form for all analysis and are presented in categorical form here for descriptive purposes only

Statistical power and sample size considerations

To determine appropriate sample size, structural equation modeling requires that in addition to statistical power, issues of the stability of the covariance matrix and the use of asymptotic theory be addressed. The power associated with specific path coefficients in complex SEM models is somewhat difficult to assess because of the importance of the assumptions about population parameters (Jaccard, 2001). An approximation of power can be obtained by using a limited information approach with single indicators which allows for the utilization of traditional power analysis software to determine sample size (Jaccard and Wan, 1996). Asymptotic theory and covariance stability simulation studies suggest that sample sizes of 125 or larger will give adequate results as long as reliable measures greater than .65 are used (Jackson, 2003, Jaccard and Wan, 1996). A power analysis using the G-Power computer software for power analysis (Faul & Erdfelder, 1992) found that between 82 and 91 cases was necessary with medium ES, alpha of .05,

and desired power of .80. Therefore a sample size of 135 cases yields satisfactory power for this study.

Missing data

There was very little missing data. Nevertheless, the small amount of missing data was evaluated for the amount and distribution of missing values. Missing data ranged from 0% for the majority of data to 2.5% on two acculturation variables. Furthermore, missing data bias was assessed by computing dummy variables reflecting the presence or absence of missing data for each variable in the model and then correlating it with all other variables in the model. Since none of these correlations were found to be significant this data is considered to be missing at random. For data that was identified as missing, a multiple imputation approach was be used with five imputed data sets (Jaccard, 2001). In these cases, values were imputed using the expectation-maximization method with importance re-sampling as described in King, Honaker, Joseph & Scheve (2001). The imputations were performed using the computer program Amelia 2.0 (Honaker, Joseph, King, Scheve & Singh, 2003).

Outliers

Tests for outliers were conducted prior to all major analysis by using two approaches. Non-model based analysis, multivariate outliers were identified by examining leverage indices for each case. An outlier was defined as a leverage score four times greater than the mean leverage of .111. Model based outlier analysis was performed through the use of limited information regression by regressing endogenous variables onto exogenous variables. Standardized dfbetas were examined for each

individual, predictor and intercept. Outliers were defined as anyone with an absolute standardized dfbeta larger than 1.0. No outliers are evident in this data.

Non-normality

Multivariate normality was evaluated using Mardia's test for multivariate normality. A kurtosis score of 3.485 with a critical ratio of 1.197 suggested the presence of non normal data ($p < 0.05$). In addition, univariate indices of skewness and kurtosis (Table 1) were examined to determine if the absolute value of any of these indices is greater than 2.0. Problematic kurtosis values were found for number of sexual partners (8.083) and alcohol consumption (2.960) which could be related to the large number of women who do not drink. Since this non-normality was determined to be issue, then bootstrapping was used for parameter estimation. AMOS 6.0 software was used to conduct the 2000 bootstrap replications and provide estimate of p values and confidence intervals and standard errors. The bias corrected approach to interval estimation was utilized, yielding 2000 meaningful solutions. In place of the traditional chi square test, the Bollen-Stine bootstrapped versions of the test was used to calculate p square statistic. Similar conclusions were reached from the traditional maximum likelihood solution and significance tests and confidence intervals are reported from the bootstrap calculations. MPLUS software was also used to verify the AMOS findings because it is highly recommended for the most precise analysis of dichotomous outcome variables within a structural equation modeling framework (Jaccard, 2001). In addition, MPLUS provides odds ratios for a more traditional interpretation of logistic regression.

Measurement error

As much as possible, measurement error was taken into account through the use of multiple indicators. In cases where only a single indicators available, a strategy suggested by Joreskog and Sorborn (1996) was adopted. This involves constraining the error unique variances for each measure to values corresponding to the alpha coefficients of previous research.

Indices of fit

There are several different ways to assess the fit of structural equation models. Following the recommendations of Bollen and Long (1993), a variety of global fit indices were used, including indices of absolute fit, relative fit and indices of fit with a penalty function for lack of parsimony. These include the traditional overall chi (x) square test of model fit, which should be statistically non-significant. A the value of x in relation to the degrees of freedom (df) can indicate invalid model parameters is employed as measure of goodness of fit (Arbuckle, 2005; Byrne, 2001). Ideally a x/df should be $= < 2.0$ but not more than 3.0. Muthen and Muthen (2005) in Mplus recommend a value ≤ 5.0 as being acceptable. As an absolute fit index, the chi-square does not use alternative models as a comparison. They are model-based in that absolute fit indices are derived directly from the covariance matrixes. They are simply derived from the fit of the obtained and implied covariance matrices and the maximum likelihood minimization estimation. It is not sufficient to look at only the chi-square as a fit index because it is impacted by issues of sample size, as well as the number and distribution of model variables (Hu and Bentler, 1995).

Noncentrality based indexes are also used to assess model fit (Hu and Bentler, 1999). The Comparative fit Index (CFI) assesses model fit by using the non-central x2 distribution with non-centrality parameters wherein CFI values equal to or greater than 0.95 indicate good model fit and a minimum value of .90 is acceptable (Bentler, 1988, Hu & Bentler, 1998). The Root Mean Square of Approximation (RMSEA) estimates the lack of fit in a model compared to a saturated model (Browne & Cudeck, 1993; Steiger, 1990). The RMSEA should be less than .08 and ideally = or < .05. The traditional Goodness of Fit Index (GFI), (which should be greater than .90) and the standardized root mean square residual should be less than or equal to 0.05 and no larger .09. In addition to the global fit indices, more focused tests of fit were pursued. These include examination of the standardized residual covariance (which should be between -2.00 and 2.00) and modification indices (which should be less than 4.00). Such results were identified as points of ill fit in the model and required additional examination.

Model Fit Evaluation

The initial research aim was to develop and empirically test a multivariate model of VCT utilization for middle aged and older Latinas. With the utilization of structural equation modeling, a complete model with all required constructs was tested. The results of the analysis with paths representing the hypothesis are explicated below. The first model tested also included all ten subscales of acculturation from the multidimensional measure of acculturation in an initial full model estimator to identify those that were most closely related to testing. Furthermore, nativity was included because of the literature discussing its influence on accessing health care. In recognition of previous research, causal paths were created from each exogenous variable to the endogenous variable of

VCT. All exogenous variables were correlated and all residuals were uncorrelated. The initial global fit indices for this structural equation model were poor, $x^2(45, p < .001) = 94.70$; CFI=.937. Once the full model diagnostics were reviewed, modification indices (MI) over 4.0 that were logically supportive of the proposed model were used to identify points of ill fit. These MI indicated that there should be paths from Income to number of Partners (MI =14.229), Age to Protected Sex (MI = 7.914) from Health Status to Protected Sex (MI = 5.867) and Age to number of Partners (MI = 4.815). These four relationships make logical sense as the sexual risk literature states that both the number of partners and amount of unprotected sex have an inverse relationship with age {Tubman et al, 2003}. Studies have been mixed in determining the relationship between income and number of sexual partners. Some studies have found that women with lower incomes are more likely to have higher number of sexual partners (Hallman, 2005) while others have found that high income relates to higher numbers of sexual partners (Mishna et al, 2007). Since the literature indicates that relationships do exist regardless of the direction and these variables have not been studied in older Latinas acquisition of VCT, it makes sense to include this path in the analysis. Finally, protected sex has been correlated with self perceived health status in the literature (Bond, Lauby & Batson (2005). Based on the theoretical logic, each of the four paths was added individually and the model was re-run to identify any improvements.

Due to the small sample size the methodological determination was made to include in the final model only those variables that were significant predicators of VCT. This analysis involved fitting reduced models (RM) to the data, which involved a process of backward elimination, successively removing variables one at a time that were not

significant and had extremely low predictive ability in the full model; that is, the model that includes all the variables in the analysis (Jaccard, 2001). The measures of nativity, income, education, marital status and respeto had no statistically significant relationship to VCT and were removed from the final model.

Final Structural Equation Model

This revised model (Figure 3) was re-run and a good model fit was recognized wherein the x^2 $(14, p => .725) = 10.497$; $x^2/DF = 0.750$; CFI = 1.00; GFI =.986; RMSEA < .001 with a p-value of close fit of .904. Additional focused fit indices were examined and no modification indices or no offending estimates were found. Standardized residuals were less than two. Another fit index is the Bayesian Information Criterion (BIC). Raftery's (1995) guidelines for calculating differences between models using BIC states that any difference greater than 10 suggests the strength of evidence for that model. The BIC for the null model (261.06) is substantially different than for proposed model (323.74) at 62.68, indicating the strength for evidence of the model.

Although all of the points of fit were substantially improved once model modifications were made, two global fit indices (CFI of 1.00 and the RMSEA.00) might suggest a perfect fit. Although this finding is common in many recent studies (Boyer, Carr, Mosley, Carson, 2006; Bryan, Schmiege, Broaddus, 2007; Cannella, Lobel, Glass, Lokshina, & Graham, 2007; Hoffman, Marquis, Poston, Summers & Turnbull, 2006; Uhrlass and Gibb, 2007) such issues should be addressed. There are a large number of fit statistics available in SEM analysis and general standards for these relative fit statistics exist. Arbuckle (2005) indicates the choice of evaluative measures becomes simpler when

the researcher realizes that the purpose of the fit measures is to compare models to each other and not to judge a singular model by an "absolute standard". The chi-square is the only absolute test of model fit. All other fit indices are descriptive (ITS, 2002). CFI values greater than 0.95 and close to 1.00 indicate good model fit (Bentler, 1988, Hu & Bentler, 1998, 1999). Since the CFI for this revised model was 1.00, other global fit indices were pursued. The Goodness of Fit Index (GFI), (which should be greater than .90) was GFI =.986 and the NFI (which should be between .9 and 1.0) was .925. Both of these are good but not perfect. The standardized root mean square residual (RMR) should be less than or equal to 0.05 was good at .024 but not perfect. The RMSEA should ideally be < .05 which indicates a close fit of the model in relation to the degrees of freedom. This figure, however is "based on subjective judgment" and cannot be regarded as" infallible" (Arbuckle, 2005). The RMSEA also is bounded by a confidence interval. Although the RMSEA for this revised model of the dissertation was .00 it did have a confidence interval of .00 to .058 and an overall p-value of close fit of .904. This indicates that the RMSEA score of .00 may actually have some variability.

AMOS reports several statistics that "create composite measure of badness of fit and complexity by forming weighted sum of the two". Also called "parsimony fit statistics" they are similar to the adjusted r-squared in multiple regression analysis (ITS, 2002). The most frequently used measure of such fit is the BIC, which is intended for model comparison and not for the evaluation of an isolated model (Arbuckle, 2005). Complex, poorly fitting models get high scores while simple good fitting models receive low scores (Arbuckle, 2005). BIC statistics prefers models that are more parsimonious. The BIC for the default (null) model (261.06) is substantially different than for

independence model (323.74) for this dissertation, indicating a model of both good and parsimonious fit. The issues related to perfect fit with the CFI and RMSEA fit statistics indicated the need to pursue additional fit indices. Since none of these other measures of fit were perfect yet did reflect a good fitting model, the researcher is comfortable presenting the revised model for this dissertation.

Thus all indications point to a good model fit as represented in Figure 3. Observed variables are represented with rectangles while straight lines emanating from them indicate hypothesized causal pathways. Path coefficients are indicated by unstandardized values in parenthesis and standardized outside of parentheses. All pathways in this figure are significant. All exogenous variables are correlated. Small circles indicate error variances. Correlations for all variables are noted in Table 5. All path coefficients, critical ratios and standards errors are illustrated in Table 6. The following section addresses the results by the primary themes that comprise this final model of VCT for middle aged and older Latinas.

Table 5.

Correlations for all Test Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Predisposing														
1. AGE	-													
2. EDU	-.014	-												
3. MARITAL	.291**	-.008	-											
4. NATIVE	.128	.252**	.094	--										
5. SPANPROF†	.172*	.318**	-.001	.521**	-									
6. DISCRIM†	-.132	-.123	-.054	-.174*	.207*	-								
Enabling														
7. INCOME	-.166	.289**	.021	.075	.044	-.099	-							
8. CLINIC	.098	-.233**	-.004	-.097	-.101	.046	-.085	-						
9. INS	.087	.144	.032	-.055	.022	-.139	.195*	-.168	-					
Need														
10. HEALTHST†	.001	.299**	-.070	.103	.222**	-.131	.291**	-.118	-.121	-				
11. PROVEND	-.134	-.003	.103	-.056	-.078	.113	-.050	-.011	.079	-.132	-			
12. ALCSEX	.323**	.024	.238**	.202*	.149	-.018	-.129	.121	-.032	-.055	.013	-		
13. PARTNERS	-.193*	-.011	-.175*	.059	-.003	.002	.326**	.123	-.006	-.021	-.074	-.078	-	
14. PROSEX	.264**	-.109	.197*	.119	.073	.093	-.104	.013	-.034	-.169*	.045	.088	-.152	-
Service Utilization														
15. VCT	.245**	-.108	.026	-.048	.011	.193*	-.143	.150	-.132	-.234**	.361**	-.180*	-.098	.058

Notes: AGE=Age; EDU=Education; MARITAL=Marital; SPANPROF = Spanish Proficiency; DISCRIM = Discrimination; INCOME= Income; CLINIC = Community clinic as regular source of healthcare; INS= Health insurance; PROVEND= Provider Endorsement; HEALTHST=Health Status; ALCSEX= Alcohol consumption during sexual activity; PARTNERS =number of sexual partners during the past 12 months; PROSEX = Percent of protected sex; VCT= Voluntary Counseling and Testing.
† These scales are scored such that higher numbers represent greater tendency of behavior in the scale name (i.e. higher scores indicate higher levels of Spanish Proficiency).
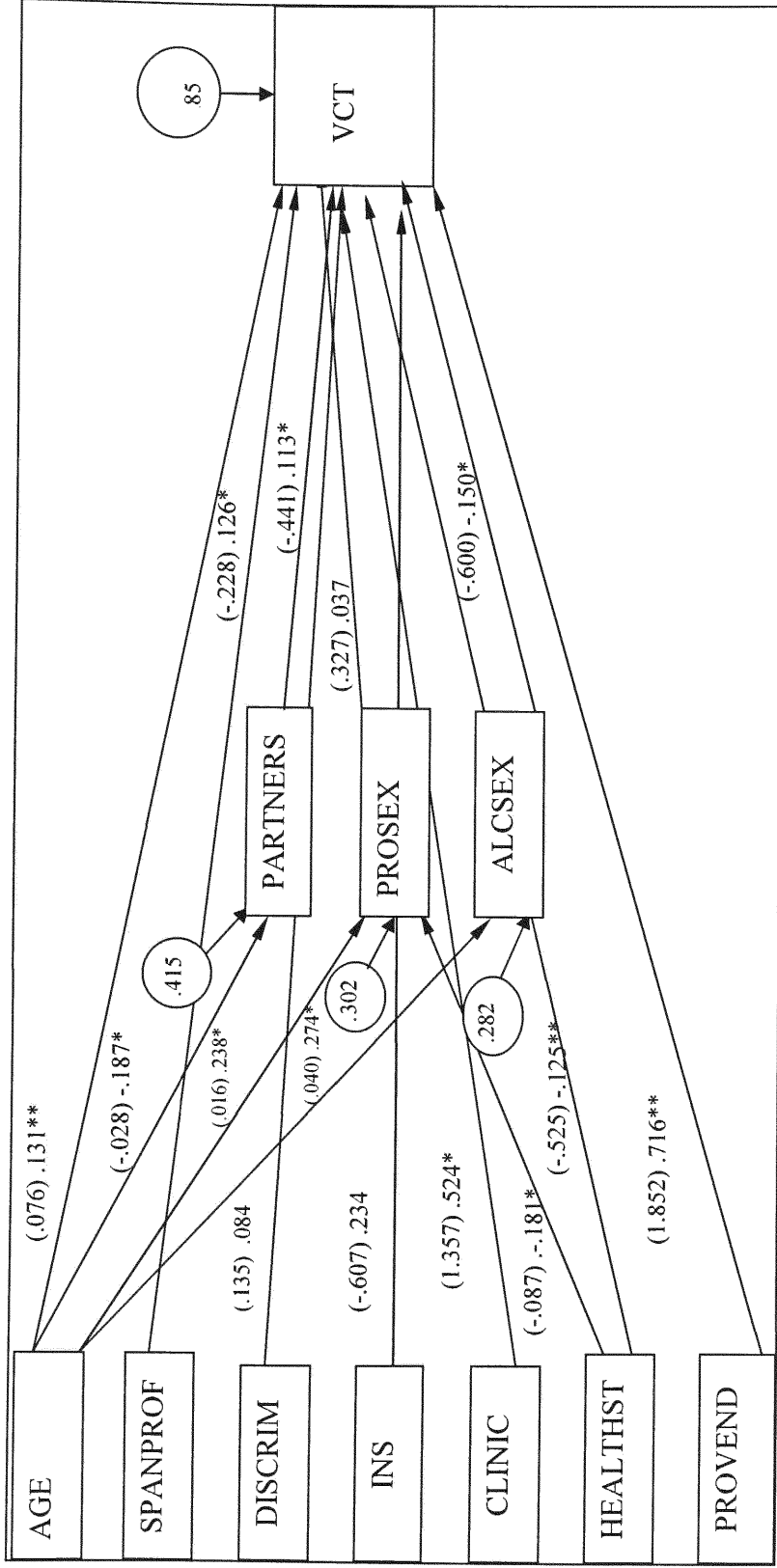* $p < .05.$ ** $p < .001.$

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Figure 3. *Final SEM Model for Voluntary Counseling and Testing for Middle Age and Older Latinas*

Notes: AGE=Age; SPANPROF = Spanish Proficiency, DISCRIM = Discrimination, CLINIC = Community clinic as regular source of healthcare, INS= Health insurance, HEALTHST=Health Status; PROVEND= Provider Endorsement, ALCSEX= Alcohol consumption during sexual activity, PARTNERS =number of sexual partners during the past 12 months, PROSEX = Percent of protected sex, VCT= Voluntary Counseling and Testing. Rectangles represent observed (measured) variables. The straight lines with arrows from observed variables represent presumed causal pathways. The values along the pathways are path coefficients. The unstandardized values are inside parentheses and the standardized values are not in parentheses. The values in the circles represent standardized error variances. All exogenous variables are assumed to be correlated.

* $p < .05$. ** $p < .001$.

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Table 6.

Final Model Coefficients

Path Description	Path Coefficient	Standard Coefficient	Standard Error	Critical Ratio	ODDS Ratio	Confidence Interval (95%)
Predisposing						
AGE to VCT	-.076	-.131	.031	2.427**	.927	(-.014) (-.015)
SPANPROF to VCT	.228	.126	.097	2.358*	1.256	(.038) (.418)
DISCRIM to VCT	.135	.084	.084	1.168	1.145	(-.029) (.299)
Enabling						
INS to VCT	-.607	-.234	.466	1.302	.545	(-1.519) (.306)
CLINIC to VCT	1.357	.524	.625	2.169*	3.884	(.131) (2.583)
Need						
AGE to PARTNERS	-.028	-.187	.010	-2.734*		
AGE to PROSEX	.016	.238	.005	3.177*		
AGE to ALCSEX	.040	.274	.011	3.607*		
PROSEX to VCT	.327	.037	.488	.670	1.386	(-.629) (1.25)
PARTNERS to VCT	-.441	-.113	.248	-1.778*	.643	(-.928) (.045)
ALCSEX to VCT	-.600	-.150	.258	-2.323*	.549	(-1.106) (-.094)
HEALTHST to PROSEX	-.087	-.181	.037	-2.391*		
HEALTHST to VCT	-.525	-.125	.218	-2.409**	.592	(-.952) (-.098)
PROVEND to VCT	1.852	.716	.494	3.748**	6.375	(.884) (2.821)

Note: VCT = Voluntary Counseling and Testing, SPANPROF =Spanish Proficiency, DISCRIM =Discrimination, INS = Health Insurance, CLINIC = Community Clinic as Regular Source of Health Care, PARTNERS= Number of Sexual Partners during the past twelve months, PROSEX =Percent of Protected Sex, ALCSEX =Consumption of Alcohol during Sexual Activity, HEALTHST = Health Status, PROVEND= Provider Endorsement.
* $p < .05$. ** $p < .001$.

Acculturation

As stated in the literature review, cultural identity is assumed to impact VCT because of challenges accessing health care for immigrants as well as cultural issues that may create barriers to VCT. This analysis led to several interesting findings. Spanish Proficiency was significant at the ($p<.05$) level with an OR of 1.256. For every unit that Spanish proficiency increased the odds of getting a VCT were predicted to increase by 1.256. Spanish proficiency also had significant positive correlations with older age ($r=.172, p <$

.05), education (r=.252, $p < .001$), nativity outside of the United States (r=.521, $p < .001$) and discrimination (r=.207, $p < .05$).

Although discrimination was not a statistically significant path to VCT, with an OR of 1.145, it seemed to be important to the overall fit of the model. Indeed when the model was run both with and without discrimination, the fit indices were greatly improved with the inclusion of discrimination. Correlation analysis did reveal that discrimination had a negative relationship to nativity (r= -.174, $p < .05$) and a positive relationship to Spanish proficiency (r=.207, $p < .05$) and VCT (r=.193, $p < .05$).

Sexual risk factors

It was hypothesized that sexual risk factors will exert a strong influence on whether older Latinas have VCT. As noted in the methods chapter, sexual risk factors were measured through three variables: number of sexual partners during the past 12 months; alcohol consumption during sexual activity, and percent of protected sexual activity. The model shown in Figure 3 partially supports this hypothesis. Alcohol consumption had a significant ($p < .05$) negative impact on VCT with an OR of .549. This means for every one unit that alcohol consumption scores increased, VCT was predicted to decrease by .549. Since higher scores on the alcohol consumption measure indicated less alcohol use, this finding means that those that consumed more alcohol were more likely to have had an HIV test. The number of sexual partners was not significantly associated with VCT with an OR of .643. This means for every one unit that sexual partners increased, VCT was predicted to decrease by .643. Percent of protected sexual activity was not significantly associated with VCT but did have an OR of 1.386. This means for every one unit that protected sexual activity increased, VCT was predicted to

increase by 1.386. Thus, a statistically significant pathway was found between sexual risk factors and VCT.

Correlation analysis revealed several significant findings. Alcohol consumption during sex correlated positively with age indicating that the older one was the less likely they were to consume alcohol during sex ($r=.323$, $p < .001$). Foreign born Latinas were more likely to consume alcohol during sexual activity ($r=.202$, $p < .05$). With regard to the numbers of sexual partners, it is not particularly surprising that there was a negative correlation, indicating that the number of partners decreased with age ($r= -.193$, $p < .05$). A significant relationship existed with higher incomes indicating higher numbers of partners ($r= .326$, $p < .001$). Finally protected sex was significantly positively correlated with age ($r=.264$, $p < .001$), meaning that the percent of protected sex increased with age, and negatively related to the perception of health status ($r=.-169$, $p < .05$), indicating that the higher number of partners, the lower perception of health status.

Health Care Provision

As illustrated in Figure 3, provider endorsement was a statistically significant *(p < .001)* predicator of VCT. Indeed, this path was the strongest predictor of VCT with an OR of 6.375. For every unit that provider endorsement increased the odds of getting a VCT were predicted to increase by 6.375. Provider endorsement did not correlate with any other variables. Since so few respondents (n=6) reported no source of health care, it was not possible to compare them to those with a regular source of healthcare. To maximize the data collected and obtain a slightly more precise indication of a regular source of care, the sources of regular care were organized into three categories (community clinic, hospital or private physician) and dummy variables were utilized.

Surprisingly, neither the use of a private physician nor a hospital as a regular source of care was significantly related to VCT. The use of a community clinic was significantly ($p < .05$) associated with having a VCT with an OR of 3.884. For every unit that the use of a community clinic increased, the odds of getting a VCT were predicted to increase by a 3.884. Education was negatively correlated with the use of a community clinic ($r= -.233, p < .001$).

Furthermore, self perceived health status was significant ($p<.01$), with an OR of .592. For every unit that self perceived health status increased the odds of getting a VCT were predicted to decrease by .592. Since higher numbers indicated better health status, this means that those with poor health are more likely to seek VCT. The correlation analysis found that self perceived health status was significantly related to sexual protection ($r=.264, p < .001$) meaning that the healthier middle aged and older Latinas considered themselves, the less likely they were to protect themselves. High levels of perceived health status also positively correlated with more education ($r=.299, p < .001$), higher income levels ($r=.291, p < .001$), greater Spanish proficiency($r=.222, p < .001$) and negatively correlated with VCT ($r=.-234, p < .001$).

Finally, the presence of health insurance was not significantly associated with VCT with an OR of .545. This means for every one unit that health insurance increased, VCT was predicted to decrease by .545. Not surprisingly, health insurance was positively correlated with higher income ($r=.195, p < .05$).

Age

Age was a significant ($p < .001$) and negative predictor of VCT. The older a woman was the less likely she was to get a VCT with an OR of .927. For every unit that

age increased the odds of getting a VCT were predicted to decrease by .927. Age was positively correlated with Spanish proficiency ($r=.172$, $p < .05$), meaning that the older one is the higher the Spanish comprehension. Older age also correlated positively with fewer sexual risk factors including decreased alcohol use ($r=.323$, $p < .001$), fewer sexual partners ($r= -.193$, $p < .05$), and more protected sexual activity ($r=.264$, $p < .001$).

Model Comparison

To determine whether the good fitting model of VCT was specific to middle aged and older Latinas, an additional analysis was conducted. Since the parent study also included data for younger women that were the daughters of the older Latinas that were the focus of this study, they were selected just for the purpose of model comparison. Thus, the final good fitting model for the mothers was analyzed utilizing SEM techniques and the cases that constituted the daughters. All exogenous variables were correlated and all residuals were uncorrelated. The global fit indices for this structural equation model were poor, x^2 (15, $p = < .012$) = 30.10; CFI=.772 with a Mardias index of 28.699 which indicated significant multivariate normality. With such poor global fit statistics there was no need to closely define the points of ill fit.

The Bayesian Information Criterion (BIC) states that any difference greater than 10 suggests the strength of evidence for that model (Raftery, 1995). Since the difference between the BIC for daughters (334.96) and mothers (323.74) was 11.22; the models to measure VCT between the groups were different. This indicates that a different model would be appropriate to determine VCT for younger women. To further explore the individual differences, variable odds ratios were compared in Table 7. Age was the only

significant predictor of VCT for the daughters for even sexual risk factors and provider

endorsement were found to be less important to VCT than for their mothers.

Table 7.

Comparison of Odds Ratios for VCT for Mother and Daughters

Path Description	Mother Odds Ratio	Daughter Odds Ratio
Predisposing		
AGE to VCT	.927**	1.067*
SPANPROF to VCT	1.256*	.893
DISCRIM to VCT	1.145	1.071
Enabling		
INS to VCT	.545	1.032
CLINIC to VCT	3.884*	3.051
Need		
PROSEX to VCT	1.386	.752
PARTNERS to VCT	.643*	1.054
ALCSEX to VCT	.549*	1.087
HEALTHST to VCT	.592**	1.351
PROVEND to VCT	6.375**	1.858

Note: VCT = Voluntary Counseling and Testing, SPANPROF =Spanish Proficiency, DISCRIM =Discrimination, INS = Health Insurance, CLINIC = Community Clinic as Regular Source of Health Care, PARTNERS= Number of Sexual Partners during the past twelve months, PROSEX =Percent of Protected Sex, ALCSEX =Consumption of Alcohol during Sexual Activity, HEALTHST = Health Status, PROVEND= Provider Endorsement.
$p < .05.$ ** $p < .001.$

Specific Aims and Hypotheses

Aim 1- Develop and empirically test a multivariate model of VCT utilization for middle

aged and older Latinas. Additionally, the following specific hypotheses for the proposed

model are delineated based on the variables emphasized in the literature.

Hypothesis 1.1) Acculturation will be a stronger predictor of VCT than self perceived health status for middle aged and older Latinas.

This hypothesis stated that acculturation variables would have a stronger relationship with VCT than self perceived health status. As stated in the literature review, acculturation is assumed to impact VCT because of the challenges accessing health care for immigrants as well as the stigma associated with VCT. Spanish proficiency was significant at the ($p<.05$) level with an OR of 1.256. Although discrimination was not a statistically significant path to VCT, with an OR of 1.145, its presence in the model strengthens the overall fit of the model. Furthermore, self perceived health status was significant ($p<.01$), with an OR of .592. Since higher numbers indicated better health status, this means that those with poor health are more likely to seek VCT.

Hypothesis 1.2) Provider endorsement will have a significant impact on VCT for middle aged and older Latinas.

This hypothesis indicated that provider endorsement would be a predictor of VCT for older Latinas. As illustrated in Figure 3, provider endorsement was a statistically significant $(p < .001)$ predicator of VCT. Indeed, this path was the strongest predictor of VCT with an OR of 6.375.

Hypothesis 1.3) Sexual risk factors will predict VCT for middle age and older Latinas.

It was hypothesized that sexual risk factors will exert a strong influence on whether older Latinas have VCT. As noted in the Methods chapter, sexual risk factors were measured through three variables: number of sexual partners during the past 12

months; alcohol consumption during sexual activity, and percent of protected sexual activity. The model shown in Figure 3 partially supports this hypothesis. Alcohol consumption had a significant ($p < .05$) negative impact on VCT with an OR of .549. Since higher scores on the alcohol consumption measure indicated less alcohol use, this finding means that those that consumed more alcohol were more likely to have had an HIV test. The number of sexual partners was not significantly associated with VCT with an OR of .643. Percent of protected sexual activity was not significantly associated with VCT but did have an OR of 1.386. Thus somewhat confirming expectations, one statistically significant pathway that was found was between sexual risk factors and VCT.

Hypothesis 1.4) Age will have a negative impact on VCT for middle aged and older Latinas.

Age was significant ($p < .001$) and negatively correlated with VCT. As expected, the older a woman was the less likely she was to get a VCT with an OR of .927.

Hypothesis 1.5) Middle aged and older Latinas are more likely to have been tested for HIV at a physician's office than at any other location.

The hypothesis that older Latinas are more likely to have been tested for HIV at a physician's office than at any other location was not supported. Instead, 64.6% (n=53) were tested at a clinic, 23.2% (n=19) at a hospital and the least 11.0% (n=9) at a private doctor's office. This finding is interesting in light of the fact that older Latinas used a private physician as their regular source of care (44%) and provider endorsement was significantly related to getting a VCT. This may suggest that while older Latinas are

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getting their regular healthcare from a private physician, once recommended to VCT by their provider, they are actually obtaining tests from a clinic.

Aim 2 – To test how the three individual components of the Andersen Behavioral Model impact VCT for middle aged and older Latinas. With the utilization of structural equation modeling, all of these were consolidated into a full model analysis with paths in Figure 3 representing the hypothesis below.

Hypothesis 2.1) Predisposing factors (age, cultural identity, and education) will have a stronger impact on VCT among older Latinas than enabling characteristics (income, health insurance) or need (sexual risk factors, provider endorsement).

This hypothesis stated that predisposing factors (age, cultural identity, and education) will have a stronger impact on VCT among older Latinas than enabling characteristics (income, health insurance) or need (sexual risk factors, provider endorsement). This hypothesis was not supported. In contrast, several predisposing factors were significant. Age was significant ($p < .001$) and negatively correlated with VCT. The other predisposing factors of education, nativity and discrimination were not significant. As noted earlier, only Spanish proficiency was a significant predictor of VCT (OR= 1.236). In keeping with Andersen's original findings and the conclusion of many studies of service utilization, the domain of need was the strongest predictor of VCT in this study. Furthermore, as illustrated in other hypotheses, both self perceived health status (OR=.592) and provider endorsement (OR=6.375) as indicators of need were significantly related to VCT. As mentioned previously, only one of the sexual risk factors alcohol consumption were significantly associated with VCT (OR=.549). By contrast, the

only enabling characteristic that was significant was that of a clinic as their regular source of healthcare.

Hypothesis 2.2) Among predisposing factors, social structural components of cultural identity, will have a stronger impact on VCT than age and nativity.

This hypothesis was partially supported. Although the social structural components, education, marital status, and discrimination were not significant predictors of VCT, neither was the demographic variable of nativity. Only the social structural components of Spanish proficiency was significant at the (p <.05) level (OR= 1.236), which was not as strong as the impact of age on VCT (p <.001) with an OR of .927.

Chapter V

Discussion

The purpose of this study was to try to shed some light on the factors that may impact the HIV testing of older Latinas. Despite burgeoning public health efforts, HIV infection is almost always diagnosed late in its course for older adults (Takahashi et al., 2005). It is important to identify conditions in which older adults will seek VCT in order to create effective strategies to encourage testing. The results of this study both confirm and expand upon the minimal previous research in this area and provide key information for service utilization by women of this cultural background and age. The fact that 60% of older Latinas reported VCT was extremely interesting and somewhat surprising given perceptions of the contribution of age, foreign born status and cultural identity to such health service use. This study differs from previous studies in several ways. Although previous research has found that Latino migrant farm workers (Fernandez et al., 2005) and adults of all races (Takahashi et al., 2005) do tend to accept VCT when recommended by a physician, this study focused such inquiry on older Latinas. This study extends the findings that health care providers have an important role in addressing the pandemic. This study considered VCT as a measure of health service utilization. This approach is unlike most studies that consider VCT as behavioral intervention that impacts risk behaviors. Furthermore, the ABM was applied to VCT and expanded to test acculturation as a multi-dimensional construct and include provider endorsement as a measure of need. The results of this study update our knowledge about VCT practices among older Latinas.

The research aims for this study were to: Develop and empirically test a multivariate model of VCT utilization for middle aged and older Latinas and test how the three individual components of the Andersen Behavioral Model impact VCT for middle aged and older Latinas. This model evaluated the relationship between predisposing variables of demographics and acculturation, enabling factors such as income and education and need on VCT. This research found that the model for VCT for middle aged and older Latinas was not applicable for the daughters, indicating that the strategy of applying research findings from younger populations to older women may not be appropriate. Furthermore, this research has identified that measures related to culture should be considered for inclusion in models of health service use but do not provide a significant barrier to VCT.

Structural equation modeling methods were used to evaluate the ABM and the results provide some guidance on the correlates for HIV testing among older Latinas. This test of the ABM and VCT further reinforced the overall findings of both Andersen's original study as well as the majority of investigations of health utilization. Measure of need continue to be the most influential predictor of service use regardless of the type of service utilized including VCT. Global measures of health status, which were not initially conceptualized to be particularly important to VCT were actually influential. Provider endorsement as a measure of the recognition of a health care professional on the need for services is extremely significant. Although perhaps a crude measure of provider perception of need, it allows for the initial conceptualization of such measures.

Predisposing

Several predisposing factors significantly impacted VCT. As expected, the older a woman was the less likely they were to get a VCT. Somewhat surprisingly, nativity was not significantly related to VCT. This could be due to the particular nature of service provision in South Florida that may differ from other cities because of the large population of foreign-born Latinas. The correlation analysis did find some interesting intra-variable activity.

Acculturation variables were hypothesized to have a strong influence on VCT. As stated in the literature review, acculturation is assumed to impact VCT because of the challenges accessing health care as well as the cultural constructs associated with HIV. The multidimensional measure of acculturation strove to capture cultural identity through the use of ten subscales that were conceptualized into Values, Language Proficiency and Cultural Knowledge. The preliminary analysis identified empirically that three Latino identified variables had reasonably strong relationships to VCT, although only discrimination was statistically significant. The other two variables of Spanish proficiency and respeto also had theoretical significance so were kept in the model. It was somewhat surprising that in the final analysis, the values domain was not at all significant to VCT. The traditional cultural concept of respeto had been considered important to VCT because of traditional Latino mores that preclude open discussion of sexual matters. Furthermore, those with higher feminism scores or Latin activism scores could have a higher likelihood of testing because of a sexual self efficacy but did not impact VCT for older Latinas. Indeed, Spanish Proficiency as the linguistic marker of acculturation most utilized in the literature was significantly important to VCT for this study. This finding

could relate to the geographical location of the participants as health and social services are primarily offered in Spanish.

Finally, although discrimination was not a statistically significant path to VCT in the final model, it remained important to the overall fit of the model. Furthermore, discrimination has a strong relationship to overall perception of health status. The experience of discrimination impacts VCT indirectly through these other measures and may be an important variable to include in studies about the health care use of older Latinas. Furthermore, nativity was included because of the literature discussing its influence on accessing health care and had no statistically significant relationship to VCT. This however could be due to the small percentage of participants that were actually born within the United States. Future studies should try to match such cohorts among older Latinas.

Enabling

An encouraging and surprising finding was that so many women, particularly given their low socio-economic status, had a regular source of health care. Furthermore, this hypothesis asserted that having a regular source of healthcare would be positively related to provider endorsement of VCT because of the opportunity for patients to request and providers to suggest such activity because of the existence of relationship. Perhaps surprisingly, neither the use of a private physician or a hospital for your regular source of care was significantly related to VCT. The use of a community clinic was significantly related to having a VCT. Furthermore, the use of a clinic as a regular source of care was negatively correlated with education, indicating that the more educated a woman was the less likely she was to get her primary source of health care at a clinic. The presence of

health insurance or high income was not found to be significantly related to VCT. This is not too surprising since most VCT is offered free at a variety of clinic sites throughout the county. Overall, enabling characteristics were not particularly important to the procurement of VCT for older Latinas.

Need

Sexual risk factors

Sexual risk factors were hypothesized to exert a strong influence on the VCT of older Latinas. Sexual risk factors were measured through three variables commonly used in such research (Tubman et al, 2003): number of sexual partners during the past 12 months; alcohol consumption during sexual activity, and amount of protected sexual activity. Since higher scores indicated less alcohol consumption, this means that those that consume alcohol are more likely to get VCT. Furthermore, more partners indicated a lower likelihood of getting a VCT. Perhaps for this study, pursuit of VCT could be associated with a level of recklessness or with regard to risk factors, those that take more sexual risks are less likely to pursue VCT. In addition since VCT is currently a primarily voluntary test only those that are the most responsible are actually getting the test. Those that have the most risk factors seem to be less likely to have been tested. This indicates that voluntary testing strategies may be missing those most at need of testing. The most efficient method to address those that are not acquiring testing is the continued push for routine, integrated VCT. This removes the need for clients to properly assess their risk and seek testing because that mechanism may not be working effectively for this population.

Health status

Correlational analysis found that self perceived health status was significantly related sexual protection meaning that the healthier one considered themselves, the less likely they were to protect themselves. Furthermore, the better one considered their health status the higher the education and income levels, as well as higher Spanish proficiency and protected sex.

Provider endorsement

As expected, provider endorsement was a statistically significant predictor of VCT for older Latinas. Since it was the strongest predictor of VCT this represents an opportunity to improve something that is currently working. Effective screening can promote healthy behaviors that prevent or minimize many serious health conditions yet women over age 45 are the least likely to seek out preventive services (Laws & Mayo, 1998). This speaks to the importance of provider recognition and endorsement of preventive screenings such as VCT. Also interesting is that fact that provider endorsement was not correlated with any other variables. Some have speculated that older adults are more likely than younger individuals to immediately act on recommendations of a health care provider because they generally have fewer sources of health information and a greater deference for those in authority. Furthermore, older Latinas because of such traditional cultural influences as respeto, a concept that includes deference to one's elders, may be extremely likely to accept and act on provider endorsement. The provider suggests testing and so they get tested although they are not at particularly high risk. Despite this perception, respeto was not significantly related to

either VCT or provider endorsement. This is somewhat surprising and may indicate the need for a more comprehensive measure of respeto to evaluate health service utilization.

Site of VCT

Most older Latinas reported VCT from a clinic, with a small portion from a hospital and the least at a private doctor's office. This finding is interesting in light of the fact that many older Latinas used a private physician as their regular source of care (44%) and provider endorsement was significantly related to getting a VCT. This may suggest that while older Latinas are getting their regular healthcare from a private physician, they are actually getting VCT at a clinic. Perhaps private physicians are actually endorsing VCT yet for older Latinas the anonymity of a clinic setting clinic provides a certain amount of appeal.

Implications for Practice

HIV/AIDS has permeated all facets of society. Older Latina women are increasingly at risk from the epidemic, yet have received minimal attention from health care professionals. For routine HIV testing programs to succeed, strategies must be developed to increase VCT. Effective prevention interventions need to recognize and surmount the barriers to VCT because VCT does not occur if barriers outweigh benefits (Awad et al., 2004). As primary care providers are often a patient's only contact with the health-care system, routinely testing at such locations could help identify HIV infection in patients who might unknowingly transmit HIV to others (Takahashi et al., 2005). Furthermore, a randomized controlled trial found that new VCT increased when offered as part of an overall prevention program in a general health clinic compared to intensive HIV prevention programs offered by an ASO (Raj et al., 2001). The provision of VCT

also provides an opportunity to link individuals with other parts of the healthcare system. Although no fully conclusive studies have determined whether these referrals actually contribute to further service utilization (Awad et al., 2004; Marx et al., 1999), several studies have found that after obtaining VCT, individuals were more likely to use other prevention services from community organizations (Peterson, Coates, Catania, Hilliard, Middleton, & Hearst, 1995) and mental health professionals (Awad et al., 2004; Hays et al., 1990). Services were more frequently used by those who had a negative test result than those who did not test or did not return for results (Marx et al., 1999). A San Francisco study found that 14% of high risk HIV sero-negatives utilize prevention referrals three weeks after obtaining testing results (Marx et al., 1999). Such studies also indicate that initiatives to increase testing will be impeded unless they include strategies to provide regular sources of healthcare and improve overall access (Bond et al., 2005). Although the CDC recommends routine VCT in medical settings where large numbers of HIV-infected people may seek care for other ailments (Janssen, 2001), women must have access to a source of healthcare for such recommendations to come to fruition (Bond et al., 2005). Such integration of prevention services into regular health activities may provide further opportunities for VCT. These recommendations seem to be consistent with the findings of this study, that provider characteristics such as the presence of a regular source of health care and provider endorsement have an impact on VCT for older Latinas.

Implications for Policy

National

One of the primary motivations for the development of the ABM was to create an analytical model that could influence policy related to health disparities (Andersen, 1973). It has been suggested that knowing one's sero-status is an elemental right that should be legally protected because it allows for the acquisition of medical and drug therapies. VCT is required to appropriately triage such persons into care (Sweat, 2006). Furthermore, the provision of VCT provides an entry point for prevention and treatment services for both HIV and the larger health care delivery system. Such access is particularly important for marginalized groups who have disparate interaction with the health care system, such as drug users and ethnic minorities (Reiss et al., 2001).

An indicator disparity is the issue of access to services; in some situations it can mean the difference between life or death (Conover and Whetten-Goldstein, 2002). Indeed multiple national organizations have addressed the issue of health disparities during recent years. Healthy People 2010 identified as its two primary goals: 1) eliminating health disparities; and 2) helping individuals increase quality of life by addressing the major determinants of health for the purpose of increasing access to care (DHHS, 2003). Furthermore, the multicultural coalition, the Intercultural Cancer Council (ICC), offers five primary causes of health disparities: 1) disproportionate socioeconomic status, resulting in unequal availability, accessibility, and utilization of health services; 2) unequal diagnosis and treatment once in the system; 3) lack of representation in scientific research which creates a paucity of factual information about their needs; 4) social

injustice; and 5) institutional and individual discrimination (ICC, 2004). All of these factors could be relevant to the spread of HIV among middle age and older Latinas.

Several national bodies are seeking to address the barriers to VCT for underserved populations generally that could impact older Latinas. The Committee on HIV Prevention Strategies in the United States recommended that, "in all clinical care settings serving HIV-infected persons and those at high risk of infection, the standard of care should include sexual and drug-using histories to help determine each person's risk and the appropriate level of intervention. As part of their 2006 Initiative, the Centers for Disease Control aims to increase VCT as part of routine medical care (Branson et al., 2006). The findings of the importance of provider endorsement for older Latinas seem particularly timely in light of these recommendations. Significant changes from previous guidelines include: 1) Routine screening for all adults; 2) The elimination of separate written consent for VCT because general consent for medical care should suffice; 3) Prevention counseling should not be required with VCT and 4) Patient notification of VCT instead of patient request. This new policy takes an opt-out approach to VCT, compared to the opt-in approach of previous policy iterations to VCT. Patients are informed that they will be tested unless they decline (opt-out) of such screening (Branson et al., 2006). Since diagnostic testing in health care settings continue to be the mechanism by which nearly half of new HIV infections are identified, timely access to VCT also improves health outcomes. Public opinion supports the elimination of barriers to VCT. In 2006 approximately 65% of adults surveyed believed that screening for HIV should be the same as for other diseases (Rotheram-Borus et al., 2006). Since most infectious diseases, such as tuberculosis, do not require standardized pretest or posttest counseling,

many have questioned this requirement for VCT. In addition, some have also suggested that such exceptionalism can lead to further stigmatization because consumers may be more likely to perceive that HIV as a hazardous illness (Bayer, 1999). Since some traditional cultural beliefs are identified with older Latinas, the elimination of such structural barriers as counseling could help improve their acceptance of VCT.

State

Although federal guidelines for VCT have been developed and disseminated, such policies are often set at the state level, meaning states can choose to reject or accept such recommendations. A salient issue in U.S. public health policy is the issue of devolution and the clashing of approaches in the quest for health protection. Steps should be considered to resolve conflicts between the recommendations and state or local regulations. Despite the structural challenges that would be implicit in such a large policy shift and the controversy such an effort would generate, states should create policies to encourage routine VCT. These challenges would include the complete training of all certified counselors to limit the amount of pre and post test counseling they require during VCT. Furthermore, educational initiatives could encourage health care providers such as nurses and social workers to include HIV in their risk screenings and doctors to include HIV in their battery of diagnostic procedures for older Latinas. Finally, a state sponsored public health marketing campaign similar to the one recently undertaken to encourage utilization of the HPV vaccine could help normalize the new policies for the public.

Local

Steps can also be taken locally to increase testing for VCT. The findings from this study could be used to illustrate the importance of providers' recommendations to older Latinas. Even if not mandated by state and federal law, hospitals, clinics and ASO's could revise their own policies to encourage that encourage such activity. Health care providers should extend their utilization of routine testing to include older women with the understanding that sufficient resources should be directed to support community clinics, where older Latinas are most likely to test. Primary health care providers need to continue to strongly encourage and normalize these women to acquire VCT, even if they are testing at a different facility. This speaks to the need for normalization of both sexual behavior and HIV testing for older Latinas to reduce the associated stigma. There is also a need for individual health care providers to confront the issues they may have regarding the sexuality of older women. Polices should continue to include HIV Services in Spanish since Spanish proficiency positively impacted the acquisition of a VCT test. The development of a preventive intervention that addresses the age, gender and culture related risks of older Latinas combined with effective screening procedures from health care providers could be essential to reduce the HIV risks of this marginalized population

Implications for Research

Research and education are critical components of any strategy to reduce and eventually eliminate health disparities. The Minority Health and Health Disparities Research and Education Act (2000) provided more than $150 million to create a National Center on Minority Health and Health Disparities at the National Institutes of Health. Recently (2003) the Department of Health and Human Services created eight Centers for

Population Health and Health Disparities to support cutting-edge research to understand and reduce differences in health outcomes access and care (Clark, 2004). The advent of older men and women as a population of concern has spurred efforts to direct resources and interventions toward them, but for now research on HIV-transmission with populations of older adults remains minimal (Nazon & Levine-Perkell, 1996). However, Latinas and the particular strengths and risks engendered by Latino culture are particularly understudied. Little is known about how older Latinas negotiate their sexual experiences, and there are considerable barriers to conducting research with this population (Zablotsky, 1998). One reason is a lack of representative samples in likely places, since caring for family members and financial hardship may preclude their participation in organizations, groups, or their utilization of primary health care services (Falvo & Norman, 2004). Further thinning of the pool of subjects may occur due to the delicacy of the subject matter (Puleo, 1996; Radda, et. al, 2003). Regardless of the barriers, strategies need to be developed that address those concerns in an ethically efficient manner.

More research should be conducted on the benefits and barriers to VCT among older and minority populations. These represent potential strengths among marginalized individuals and communities that can be leveraged to increase health service utilization. Further studies should explore older Latinas knowledge and beliefs about HIV/ AIDS and the relationship to both risky behaviors and VCT (Levy-Dweck, 2005). A particular focus should include more comprehensive measurement of respeto and as well as provider based discrimination and their relationship to VCT. Such information could help develop informed interventions that would serve the diverse segments of the older

adult population (Stall & Catania, 1994). Additional research should compare the use of the ABM for VCT across race and ethnicities and gather more specific information about both testing sites and health care facilities. Other studies have found personally knowing someone who is HIV or AIDS is associated with a higher perceived risk for HIV(Bond et al., 2005) . It would be interesting to know if this impacts older Latinas VCT.

The field of social work has created a very aggressive agenda to address the issues of health disparities (Clark, 2004). The preamble to the National Association of Social Workers (NASW) Code of Ethics states that in addition to enhancing human wellbeing and meeting their needs, social workers need to empower "people who are vulnerable, oppressed, and living in poverty." This is done by addressing the environmental and contextual forces that culminate in individual troubles thorough encouraging awareness and responsiveness of the organizations and communities that could help meet those needs (NASW, 1998). The field of social work has a unique opportunity to be involved in impacting HIV/AIDS among older Latinas. This study strove to include the social work perspective into the analysis of VCT for middle aged and older Latinas.

Limitations

Several limitations of the study bear examination. For instance, there may be alternative models that could also account for the obtained findings. Moreover, although a reasonably good fit was achieved, the model tested in this study may not be complete. Other variables may have impacted VCT in addition or in combination with the constructs that were tested and included in the final model.

Measurement issues pose additional problems. Although interviewers received extensive training in rapport building to facilitate the elicitation of unbiased response,

constructs such as sexual behaviors were not verifiable through any means other than subject self-report. Heavy reliance on self-report measures could inflate or confound results. For example, self-reported health status could be influenced by cultural context, health beliefs or objective health status.

These findings would have been strengthened if it had been possible to obtain data from other sources such as provider perceptions or medical records. Furthermore, most of the measures collected for the primary study, and thus used in this secondary analysis, were single item indicators. Future studies would be enhanced by including additional variables to ensure accurate capture of constructs.

The impact that age was found to have on VCT may appear more important in this study than is accurate. The odds ratio of the age variable, although statistically significant, may not truly be particularly informative since the age variable was continuous and the odds nearly equaled one. Future studies may find it more meaningful partition the age variable by decades or age categories (middle age, retirement age, etc.) to obtain slightly less precise but more practical findings. Conversely, although low income and low education of participants, were not found to be statistically significant, these variables may be important in future studies. Given the importance of these constructs in the literature and previous studies of health provision and prevention, it may be beneficial for future research to utilize more sophisticated measures.

Moreover, a larger, more representative sample would enhance confidence in findings obtained in this study. Most respondents were not born in the United States so contrasts based on nativity were based on a very small sample number of native born women. A sample with a larger number of native born women would better establish the

predictive value (or the absence thereof) of nativity with respect to VCT. In addition to a larger and more representative sample, future research should include more precise measures of nativity and country of origin. It remains to be seen whether the effects of these variables would hold across diverse groups of Latina women. It is possible that there is more intra-group variability within the Latina community than these methods and sample were able to capture.

Although this research attempted to address the multidimensional nature of acculturation, further development of measurement tools is warranted. Acculturation measures are particularly sensitive to context, and possibly to variations in place of origin and the setting or community in which measurements are taken. These findings illustrate that more work needs to be done in this area to fully capture the multidimensional nature of acculturation.

As mentioned previously, there were limitations related to the sample. This was a small sample of 135 women. Although deemed acceptable based on factor analysis and less restrictive assumptions of structural equation modeling, future studies would benefit from a larger sample size. Additionally, the sample was not random. The original study utilized snowball sampling techniques with referral incentives. It is therefore possible that the sample could have been biased in unpredictable ways, or that small idiosyncrasies in the sample my have magnified importance due to the small size of the sample. For example, although this is merely speculation, it is possible that participants with the same health care provider, one who endorses VCT, could be overrepresented in the sample, even if providers in the general population did not generally endorse VCT (a finding that would have been more consistent with the literature), thus skewing the findings.

Moreover, this sample was primarily comprised of immigrants who may be more familiar with clinics (the setting where most of the testing occurred) than the general population. Although it is only possible to speculate, it seems possible that providers working in settings where VCT is regularly provided might be more likely to recommend VCT, regardless of other characteristics (such as age, culture, ethnicity, race, etc.) of their clients. Furthermore, testing may be more normative for older individuals in immigrant communities.

Although the sampling strategy allowed for a large amount of participation from normally hidden communities, this too could bias the results by drawing from social networks are not necessarily typical of the broader community of older Latinas in Miami. This study is also limited in generalizability due to the particular geographic focus on Latinas in South Florida, which may not be representative of other regions. The older Latinas profiled in this study indicated both low income and low levels of multi-dimensional acculturation. Although this may be somewhat typical of older women in South Florida and therefore not particularly surprising, it is important to recognize that such findings are not representative of all older Latinas. Moreover the Latino community in South Florida tends to be both different and more diverse in terms of country of origin than other areas of the US with large Latino populations.

Despite these challenges, this study provided an opportunity to begin the exploration of VCT patterns among middle aged and older Latinas. The study also provides a number of findings that can serve to guide future research in this area.

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PUBLICATIONS AND PRESENTATIONS

Beaulaurier, R., L. Craig, S. L. & De la Rosa, M. (in press). Latina Seniors and HIV/AIDS. *Journal of Gerontological Social Work.*

Craig, S.L. (2006, January). *"Like a Family": the Effects of an HIV Prevention Intervention on Latino Men Who Have Sex with Men".* Paper presented at the meeting of the Society for Social Work and Research, San Antonio, TX.

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Craig, S.L. & Beaulaurier, R.L. (2006, November). *Educating Medical, Public Health and Social Work Professionals about the Risks of HIV/AIDS in Seniors.* Paper presented at The Gerontological Society of America's 59th Annual Scientific Meeting, Dallas, TX.

Craig, S.L. & Beaulaurier, R. L., Newman, F.L. (2005, November) *Health Seeking Behaviour and HIV/AIDS: Cultural considerations with older Latina Women.* Poster presented at The Gerontological Society of America's 58th Annual Scientific Meeting, Orlando, FL.

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