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# An Investigation Of Health Literacy, Acculturation, Diabetes Knowledge, And Social Supports Among Latinos With Diabetes In Southern Ontario

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A thesis submitted in partial fulfillment of the requirements for the degree in Master of Science

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AN INVESTIGATION OF HEALTH LITERACY, ACCULTURATION, DIABETES  
KNOWLEDGE, AND SOCIAL SUPPORTS AMONG LATINOS WITH DIABETES IN  
SOUTHERN ONTARIO

(Thesis format: Integrated-Article)

by

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Graduate Program in Nursing

A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Science in Nursing

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## Abstract

The prevalence of diabetes is high among Latino people. This study investigated the relationships between health literacy, acculturation, social support, and diabetes-related knowledge among Latino adults with Type 2 diabetes and informal caregivers with a family history of Type 2 diabetes. A non-experimental, cross-sectional design was used to examine these relationships among 73 adult Latino participants living in Southern Ontario. Based on Nutbeam's conceptualization of health literacy, associations existed between health literacy, acculturation and knowledge of diabetes among Latino participants, yet the concept of social support showed no direct relationship to health literacy. This research has explored the factors that influence health literacy, and how limited health literacy may have detrimental effects on health outcomes for Latino people with diabetes and/or their family caregivers. Thus, this research is crucial for the planning and implementation of diabetes programs aimed at Latino populations to improve their management of chronic disease.

**Keywords:** health literacy, diabetes, diabetes knowledge, acculturation, culture, social support, Latino, Hispanic

### Co-Authorship

Ivonne Aguilar completed the following research under the supervision of Dr. Lorie Donelle, Dr. Carol Wong, and Dr. Marilyn Evans who will be co-authors on any publication of work outlined in the Chapter 2 manuscript.

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## Chapter One

### Introduction

Of the approximately five million immigrants living in Canada, over 300,000 people have immigrated from Latin America, including countries from both Central and South America (Statistics Canada, 2006). *Latino* refers to people born in countries whose language derives from Latin, while *Hispanic* refers to people born in countries under the Spanish-ruling of the 16<sup>th</sup> century, where Spanish is the mother language (Caballero, 2005). The ethnic terms *Latino* and *Hispanic* are usually used interchangeably in the literature to define people of Latin American ancestry or birth (Caballero, 2005). The Latino population is one of the major ethno-cultural groups in Canada (Statistics Canada, 2001a) with the majority of individuals and families settling in the provinces of Ontario, Quebec, British Columbia and Alberta (Statistics Canada, 2001b). An estimated 147,000 people with cultural backgrounds of origin in Latin America reside in the province of Ontario (Statistics Canada, 2006). Reasons for the influx of Latino immigration to North America include political turmoil, war, and its aftermath in homelands, and the desire for family safety and protection (Centre for Addiction and Mental Health, 2009).

Statistics Canada (2001b) estimates that most Latino people in Canada reside in one of the three large metropolitan cities of Toronto, Montréal, and Vancouver, with approximately 31% living in Toronto. However, London, a city in close proximity to Toronto, has a significant number of Latino families also settled within its city limits (Public Health Agency of Canada, 2011a). Of approximately 47,000 visible minorities in London, Latinos are one of the top three cultural groups, consisting of 8,000 people (Statistics Canada, 2007).

As a cultural group, the Latino population in North America has been labelled as a high health risk community (Public Health Agency of Canada, 2011a) with high rates of chronic disease including diabetes mellitus, cardiovascular disease, HIV/AIDS, cancer, and mental illness (Bachman, Tobias, Master, Scavron, & Tierney, 2008; Britigan, Murnan, & Rojas-Guyler, 2009; Van Servellen, Brown, Lombardi, & Herrera, 2003). Of these conditions diabetes mellitus is among the most pressing as it contributes to increased health disparities, and complications related to the disease (Public Health Agency of Canada, 2009; Wallace, 2010). Specifically, significant co-morbidities of hypertension, ischemic heart disease and heart attack are three times more likely for people diagnosed with diabetes (Public Health Agency of Canada, 2009). Latino

adults are three to four times more likely to develop Type 2 diabetes when compared to the general population in Canada (Public Health Agency of Canada, 2011a).

The increased prevalence of chronic disease within Latino immigrant groups has implications for municipal, regional, and national health care systems (DeRose, Escarce, & Lurie, 2007). Accessibility to health care resources may be limited as a result of the governing policies that affect funding programs within the health care system and/or impact personal insurances (DeRose et al., 2007). The consequences could be detrimental, thus the health care system needs to consider effective ways to respond to the health needs of a vulnerable group of people (Creatore et al., 2010; Graham, Jacobs, Kwan-Gett, & Cover, 2008; Williams et al., 1998). The Centre for Vulnerable Populations Research at the University of California Los Angeles [UCLA] describes vulnerable populations as “social groups with increased relative risk (i.e., exposure to risk factors) or susceptibility to health-related problems. This vulnerability is evidenced in higher comparative mortality rates, lower life expectancy, reduced access to care, and diminished quality of life” (nd, para. 1). Thus, the health disparity among adult Latinos with diabetes places optimal health outcomes and wellbeing in jeopardy since health care is not accessed and utilized (UCLA, nd).

In 2012, over 1.8 million Canadians aged 12 years and older were living with diabetes, approximately 801,000 were adult Canadians aged 45 to 64, and 134,529 were in the 35 to 44 age range (Statistics Canada, 2013). Of Canadians 65 years and older, 847,624 had diabetes, demonstrating an increased incidence of diabetes in an aging population (Statistics Canada, 2013). In 2012, the province of Ontario had 756,886 documented cases of diabetes among individuals 12 years of age and older, and the Middlesex-London Health Unit had a reported 26,122 people with diabetes (Statistics Canada, 2013).

The Public Health Agency of Canada acknowledges that people of Aboriginal, Asian, Latino, and African descent are groups at particular risk for diabetes (2011b). The barriers that may contribute to this health disparity include immigration, poor living conditions, and employment concerns (Public Health Agency of Canada, 2011a). Additionally, the chance of developing Type 2 diabetes increased for those over the age of 40 years, which makes the increasing proportion of aging Canadians a cause for concern (Public Health Agency of Canada, 2011a; The National Diabetes Management Strategy [TNDMS], 2011). A twofold increase in diabetes was seen in children whose parents had diabetes compared to children whose parents

did not have diabetes (Public Health Agency of Canada, 2011a). Individuals with diabetes must also understand what diabetes means and how it may affect current lifestyles and family life (Canadian Diabetes Association, 2014; Cavanaugh et al., 2008).

Health disparities, such as prevalence of chronic conditions, exist among various racial and ethnic groups in North America (Britigan et al., 2009; Coffman et al., 2007; Creatore et al., 2010; DeRose et al., 2007; Thackeray, Merrill, & Neiger, 2004). Our understanding of health and disease are shaped by cultural beliefs and practices (Caban, Walker, Sanchez & Mera, 2008; Thackeray et al., 2004). Acculturation is the process in which aspects of culture (ie., dietary habits) and psychology (ie., belief systems) are exchanged between members of two cultural groups (Berry, 2005; Marin & Gamba, 1996), in situations where cultural traits may be imposed or freely accepted by the groups (Redfield, Linton, & Herskovits, 1936). Through this interaction, individuals keep or adapt certain practices and behaviours that differ from one's own cultural group (Berry, 2005; Marin & Gamba, 1996). Furthermore, members of the group may possess certain attitudes in how they wish to interact, integrate, or disregard the new group when acculturating to the new society (Berry, Kim, Power, Young, & Bujaki, 1989). Thus, certain cultural lifestyles and dietary preferences, beliefs, practices, and behaviours may have a significant influence on individuals' health promoting practice and management of chronic conditions, specifically diabetes (Lara et al., 2005; Thackeray et al., 2004). Avoiding common customs that impact negatively on diabetes may be a challenge for individuals, given the cultural value and meaning inherent in these traditions (Shaw, Huebner, Armin, Orzech, & Vivian, 2009; Thackeray et al., 2004). However, such behaviour modifications (e.g., meal preparation is determined by one's own needs and not family preference) may be necessary for individuals to manage their diabetes (Caban et al., 2008). Thus, awareness of cultural practices by health care professionals is significant in light of acculturation processes and its impact on diabetes prevention and management (Thackeray et al., 2004). People living with diabetes are also expected to modify their diets, and follow-up with laboratory blood results and doctor visits (Canadian Diabetes Association, 2014; Cavanaugh et al., 2008). Indeed, health literacy, specifically numeracy skills, play a huge role in diabetes management as individuals need to interpret glucose readings, administer medications as prescribed, and moderate carbohydrate intake (Cavanaugh et al., 2008).

Health literacy is described as “the personal, cognitive and social skills which determine the ability of individuals to gain access to, understand, and use information to promote and maintain good health” (Nutbeam, 2000, p. 263). This definition of health literacy will guide this research study and it aligns with the World Health Organization’s (WHO) explanation of health literacy as the skills an individual needs to make informed decisions to improve their wellbeing (Nutbeam, 1998). These skills include “reading, writing, listening, speaking, numeracy...critical analysis...communication and interaction skills” (Coleman et al., 2008, p. 1). Adequate health literacy skills can support individuals’ understanding of health issues and contribute to informed decision-making (Nutbeam, 2000). In contrast, inadequate health literacy skills can have detrimental effects on a person’s “health [by] directly...limiting their personal, social and cultural development” (Nutbeam, 1998, p. 10). Thus, inadequate health literacy skills can contribute to the existing health disparities among vulnerable groups if unique health information and services are not developed and promoted.

A report by the Canadian Council on Learning (CCL) describes health literacy skills as essential to access, read, appraise, communicate, understand, and act upon health information (2008). Therefore, health literacy skills will allow an individual to make sound health care decisions and improve their management of health conditions (CCL, 2008). Individuals may use multiple literacy skills (e.g., prose literacy, document literacy, and numeracy skills) concurrently to manage illness (CCL, 2008).

Health literacy is affected by various factors, such as age, gender, education, social supports, and cultural context, which may contribute to the existence of health differences among certain vulnerable groups (Caban et al., 2008; Nutbeam, 2000, 2008; Thackeray et al., 2004). Specifically, perceived social support may serve as a protective mechanism for individuals managing a chronic illness (Latham & Calvillo, 2009). These individuals may see loved ones as alliances that oversee, manage, or direct the care needed to help them cope and properly understand chronic conditions such as diabetes (Caban et al., 2008; Clark, Vincent, Zimmer, & Sanchez, 2009; Weiler & Crist, 2009). For Latino individuals with diabetes, the cultural norm of depending on family, or *la familia*, to support them through their management of diabetes is common (Caballero, 2005; Clark et al., 2009). Latino family members may need to learn and/or change dietary eating habits and food preparation to adhere to the frequently prescribed carbohydrate limitations placed on their loved one’s diabetes treatment plan (Clark et al., 2009;

Weiler & Crist, 2009). To learn how to optimally manage diabetes is crucial not only for the Latino with diabetes, but also the family caregiver, in order to witness and participate in portion control and food selection (Clark et al., 2009; Weiler & Crist, 2009). At Latino cultural gatherings, social conflicts may arise when one refuses food that misaligns with diabetes health teachings (Weiler & Crist, 2009). It may jeopardize existing relationships or be seen as disrespectful (Weiler & Crist, 2009). Furthermore, this family caregiver has a greater chance of developing diabetes themselves if they are obese, have a family history of diabetes, and identify as Latino (Public Health Agency of Canada, 2011b). Thus, adequate health literacy skills among Latino individuals diagnosed with diabetes and their caregivers are critical in the management of diabetes and the prevention of health-related complications among Latino families.

Latino cultural upbringing may influence individuals' decision-making and management of disease (Clark et al., 2009; Weiler & Crist, 2009). Culture has been associated with health literacy in which language barriers, cultural norms and values, impact individuals' lifestyle choices (Lora et al., 2011; Marin & Gamba, 1996). For example, the inability to be proficient in the dominant language of the society may limit an individual who is seeking health professional advice or treatment for an illness (Graham et al., 2008; Sudore et al., 2009). This language barrier has been shown to have negative effects on health literacy, as some individuals cannot speak the English language well enough to communicate their concerns or to grasp the information given by health care providers (Britigan et al., 2009; Sudore et al., 2009). Brice and colleagues (2008) measured the functional health literacy of Spanish-speaking and English-speaking emergency department clients and reported that 74% of Spanish speakers had inadequate levels of functional health literacy. Poor reading ability in their native language and minimal educational level attainment were proposed contributors to low health literacy scores (Brice et al., 2008). Limited reading skills and/or language barriers can compromise chronic disease management (Britigan et al., 2009), and increase the risk of complications (ie. diabetes) due to a lack of understanding or adherence to treatment plans (Thackeray et al., 2004).

Canada is a recognized leader in health literacy, having established the National Literacy and Health Program in 1994 (Rootman & Ronson, 2005). Furthermore, Rootman et al. (2003) conducted an environmental scan and needs assessment to explore health literacy in Canada, which included 48 health literacy clinicians, researchers, and health policy makers. Numerous informants reported that few studies take into account the perspectives and varying health

literacy levels of different cultural groups (Rootman et al., 2003). Research on health literacy and the Latino population has predominantly been conducted in the United States (Baker, Gazmararian, Sudano, & Patterson, 2000; Cavanaugh et al., 2008; Coffman & Norton, 2010). The existing research has demonstrated that many Spanish-speaking immigrants have low health literacy test measures (Baker et al., 2000; Brice et al., 2008), yet there is much debate as to the conflicting effects other background variables such as age, education or fluency in English have on evaluating health literacy (Baker et al., 2000; Brice et al., 2008).

### **Health Literacy Conceptual Framework**

Nutbeam's model of health literacy guides this research (Nutbeam, 2000). Nutbeam (2000) frames health literacy skills into three broad categories: functional, interactive, and critical health literacy. Functional health literacy is defined as the simple reading and writing skills needed to function in daily life (Nutbeam, 2000). Being able to read and understand health information from a brochure is an example of functional health literacy skill. Interactive health literacy includes advanced cognitive, social, and literacy skills that are required to obtain information from various sources and within supportive settings, and to apply information to various contexts (Nutbeam, 2000). An example of interactive health literacy would be participation in a diabetes education workshop, where individuals would share information and gain support from each other. Critical health literacy includes advanced social and cognitive skills that enable critical examination of the broader social and economic determinants of health, thus leading to change within individuals, communities and at the societal level (Nutbeam, 2000). An example of critical health literacy would be membership in a group that advocates for public and government support for a nurse practitioner-run clinic in a lower-income neighbourhood.

In Canada, universal health care is extended to immigrant groups, yet issues of language, culture, social support and health literacy skills can create barriers for Latino immigrants in accessing the Canadian health care system (Rootman & Ronson, 2005). Since the majority of research related to Latino immigrant health is derived from the United States, there is limited Canadian research regarding the health literacy of Latino immigrants specific to their experience with Type 2 diabetes. While Nutbeam (2000) frames health literacy skills as functional, interactive and critical, this research will focus on the functional health literacy skills among Latino immigrants within Ontario. Therefore, the purpose of this research is to assess the

functional health literacy skills and the diabetes health information resources utilized by adult Latinos diagnosed with Type 2 diabetes or informal caregivers with a family history of Type 2 diabetes living in Southern Ontario, as the prevalence of Type 2 diabetes is higher among this cultural group (Public Health Agency of Canada, 2011a). The associations among health literacy, social supports, acculturation and diabetic knowledge will also be investigated. This research will contribute to diabetes prevention programs and health initiatives aimed at Latino immigrants living with diabetes and their informal caregivers (Caban et al., 2008). Ultimately, this research may assist in improving access, planning, and the implementation of community programs aimed at Latino adults with varying levels of health literacy (Nutbeam, 2000, 2008).



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## Chapter Two

### Background and Significance

Health literacy is reflected in the personal, cognitive, and social skills which determine an individual's ability to access, understand, and utilize health information to maintain good health (Nutbeam, 2000). At minimum, reading, writing, and numeracy skills are required for prevention and self-management of chronic disease (Cavanaugh et al., 2008; Cavanaugh, 2011; Schwartzberg, 2002). Chronic disease disproportionately affects people with low literacy and ineffective health literacy skills (Schwartzberg, 2002). Thus, with inadequate literacy and health literacy skills, many individuals with chronic disease lack the skills to adequately obtain, understand and act upon health information and services to make informed decisions regarding their own health (Canadian Council on Learning [CCL], 2008; Cavanaugh, 2011; Cavanaugh et al., 2008; Schwartzberg, 2002). Sixty percent of Canadians do not have adequate health literacy skills which may create significant challenges in managing disease and/or maintain good health (Public Health Agency of Canada, 2014). The majority of Canadians would have difficulty accessing and using health information that is available at educational, health, and community settings (Public Health Agency of Canada, 2014).

The health outcomes of people are a product of individual lifestyle choices and practices, which are influenced by the determinants of health - social, economic, and environmental factors (Coleman et al., 2008; Nutbeam, 2000; World Health Organization [WHO], 1986). Health care initiatives that do not account for these factors are less likely to result in positive behaviour modification and lifestyle changes, and will most likely fail (Nutbeam, 2000).

Prevalent worldwide, diabetes affects 347 million people globally (WHO, 2014). In 2012, more than 1.8 million Canadians aged 12 years and older were diagnosed with diabetes, and diabetes incidence increased seven-fold for individuals greater than 45 years of age compared to Canadians aged 35 - 44 (Statistics Canada, 2013). The province of Ontario has more than 756,000 Canadians older than 12 years living with the condition, and the London-Middlesex Health Unit has a reported 26,122 people diagnosed with diabetes in the area (Statistics Canada, 2013). Diabetes affects adult Canadians at an alarming rate and as the population ages its prevalence will continue to increase without effective prevention and promotion strategies.

With improper glucose-surveillance and non-adherence to self-management regimens, major complications can arise with Type 2 diabetes including heart disease, amputations, blindness, neuropathy, kidney damage, and wound ulcers (Caballero, 2005; Lewis, Heitkemper, & Dirksen, 2000; Lora et al., 2011). Adequate health literacy skills are essential in one's comprehension of the diabetes treatment plan, wherein medical visits and laboratory tests, daily counting of carbohydrates and medication self-administration, are required everyday tasks to ensure a balance in blood glucose levels and avoidance of any complications (Wallace, 2010).

Chronic conditions, such as diabetes, affect certain ethnicities more than others (Creatore et al., 2010; Thackeray et al., 2004). In fact, there is an increased prevalence of Type 2 diabetes among Latinos (Creatore et al., 2010). The terms *Latino* and *Hispanic* refer to the ethnicity of people born in Latin American countries, or identifying by ancestry, and both terms are commonly used interchangeably in the literature (Caballero, 2005). For this study, the term Latino will be used to refer to people born in Latin America. When compared to the general population, the prevalence of diabetes escalates to three- to four-times more for Latino people living in Canada (Public Health Agency of Canada, 2011). Furthermore, Latinos with diabetes experience a greater number of diabetic complications compared to other ethnic groups (Caballero, 2005). Latino women and men also experience diabetes differently, in that their cultural traditions and expectations influence their diabetes management practices (Caban, Walker, Sanchez, & Mera, 2008; Creatore et al., 2010). Latino men with Type 2 diabetes are reportedly more likely to have their spouses or girlfriends care for them and monitor their food intake (Caban et al., 2008). Whereas, Latino women reported concerns with cooking traditional foods in healthier ways and family food preferences superseding their own nutritional requirements (Caban et al., 2008; Weiler & Crist, 2009). However, there is limited literature on how acculturation affects the health experiences of Latinos with diabetes (Hasnain et al., 2013). It is important that issues of acculturation and the health of Canadian-Latinos are explored to establish effective, culturally informed diabetes health promotion and prevention strategies.

Individuals of Latino heritage greatly value family and social gatherings (Caballero, 2005; Lora et al., 2011). Latinos tend to maintain close ties to their families. For example, Latino family members acting as informal caregivers would contribute to essential blood glucose control practices of a family member diagnosed with diabetes; informal caregivers may monitor

their loved one's blood sugar levels or act as decision-makers regarding food choices for the entire household (Clark, Vincent, Zimmer, & Sanchez, 2009; Lora et al., 2011).

Cultural, economic, and political factors have an impact on the management of diabetes among individuals living with the disease and their caregivers (Caban et al., 2008; Clark et al., 2009). Government policies and decisions affect how community programs function and affect the overall structure of the health care system. With diabetes management, financial stressors may arise among Latino families; for example, prescribed food choices and medications may place a strain on the household income if too costly (Clark et al., 2009). At social gatherings, it may be perceived as offensive or inhospitable to refuse food that is not included in a prescribed diabetic diet, which in turn can negatively impact serum glucose levels (Weiler & Crist, 2009). Thus, informal family caregivers have a special role of easing the burden of diabetes by assisting Latino adults in managing their condition by motivating, reminding, monitoring, and actively participating in task-completion, such as with meal choices (Bailey et al., 2014; Clark et al., 2009; Weiler & Crist, 2009). Caring for their loved ones would require that family caregivers increase their understanding of diabetes, and adopt healthy eating habits (Ramal, Peterson, Ingram, & Champlin, 2012).

Effective management of Type 2 diabetes depends on health literacy skills and diabetes knowledge to effectively recognize symptoms, and seek professional care as needed or warranted (Coffman, Norton, & Beene, 2012). For example, the ability to recognize that some conditions, such as hyperglycemia may require intervention by the individual or a health care provider (Coffman et al., 2012). Also, diabetes knowledge and health literacy skills are essential to find, understand and apply information to dietary choices, portion sizes, and the administration of the correct dose of medication for glucose control (Coffman et al., 2012; Wallace, 2010). Low health literacy has been attributed to low levels of diabetes knowledge in Spanish-speaking adults (Coffman et al., 2012; Williams, Baker, Parker, & Nurss, 1998). Family caregivers of Latino adults with diabetes play an important role in assisting their family member manage their diabetes (Cutilli, 2010; Weller et al., 1999; Williams et al., 1998), yet little is known about the health literacy skills and diabetes knowledge of Canadian Latinos and their informal family caregivers.

This study explored the relationships among the variables of acculturation, social support, and diabetes knowledge with the health literacy of Latinos living with diabetes and their



caregivers that have a family history of diabetes. This research contributed to the limited health literacy literature that exists pertaining to Canadian immigrant groups (Rootman & Ronson, 2005), and specifically to the experience of Latino immigrants with Type 2 diabetes.

### **Literacy Skills**

The Adult Literacy and Life Skills (ALL) survey examined the literacy skill of Canadian adults aged 16 to 65 years, and included assessments of prose, numeric, and document skills (Statistics Canada, 2003). “Prose literacy” is defined as the knowledge and abilities required by an individual to comprehend and utilize textual information; for example, in pamphlets, manuals, or news stories (Statistics Canada, 2003). “Document literacy” describes the knowledge and abilities to complete and interpret information on an application form, work schedule, or graphical representation of information (Statistics Canada, 2003). “Numeracy”, the third domain in literacy, is defined as the knowledge and ability of an individual to solve numerical challenges in a given situation; to calculate specified medication dosages on a prescription bottle (Statistics Canada, 2003). A total literacy score comprised of the three literacy domains ranges from 0 to 500-points (Statistics Canada, 2003). Literacy skill level is categorized as Level 1 (0 to 225 points), Level 2 (226 to 275 points), Level 3 (276 to 325 points), Level 4 (326 to 375 points), and Level 5 (376 to 500 points). Level 1 literacy skill is reflective of one’s ability to read short passages, organize dates and solve simple math problems. Level 2 reflects an ability to complete tasks such as comparing and contrasting two pieces of information or analyzing simple charts. Achievement at Level 3 considers the ability to solve mathematical challenges given in various formats or integrating various pieces of prose information. Level 4 literacy skills suggests the ability to solve abstract problems and make inferences from long passages; and, Level 5 skill is the highest level of literacy, which suggests the most advanced abilities. Those with advanced literacy skills have the capacity to understand material that is complicated with extra data, and have the ability to make inferences and apply specific knowledge to solve mathematical problems or understand complex issues. Important to note, Level 3 literacy skill is considered the essential level of proficiency to effectively cope with the demands of everyday living (Statistics Canada, 2003).

In Canada, adults over aged 16 years had scores of 47.7%, 48.6%, and 55.1% for prose, document, and numeracy domains, respectively (Statistics Canada, 2003). These were all unfortunately below Level 3 standards (Statistics Canada, 2003). It is concerning that 42% of

Canadians aged 16 and 65 performed below Level 3 competency on the prose domain (Statistics Canada, 2003). Thus, a large percentage of these individuals will be limited in their ability to adequately meet the increased skill demands of the current information age, which dominates most occupational, educational, and health care settings (Statistics Canada, 2003). This is particularly true for older Canadians; prose literacy decreases with age, with individuals aged 56 to 65 years showing one of the largest declines (Statistics Canada, 2003). In essence, approximately half of Canadian adults are limited in their ability to effectively cope with work tasks and health care issues, and this is even more challenging for older Canadians where decline in cognition may also contribute to their capacity to manage (Statistics Canada, 2003).

Adult immigrants aged 16 to 65 years scored considerably lower in their assessed skills compared to the average for the Canadian-born population in the prose, document, and numeracy domains; specifically, performing at Level 1 and Level 2 on the prose, document, and numeracy domains (Statistics Canada, 2003). Interestingly, years of residence in Canada had no significant influence on literacy proficiency (Statistics Canada, 2003).

### **Health Literacy**

While there are multiple definitions of health literacy cited in the literature (Cavanaugh, 2011; Institute of Medicine [IOM], 2004; Sorensen et al., 2012), commonalities across definitions stress that health literacy skills are needed to make informed health care decisions and that health literacy skills are influenced by attributes such as culture, language, and one's environment (IOM, 2004).

This research will be guided by the definition of health literacy provided by Nutbeam (1998), which has also been adopted by the WHO (Nutbeam, 1998; 2000). Nutbeam defines health literacy as “the personal, cognitive and social skills which determine the ability of individuals to gain access to, understand, and use information to promote and maintain good health” (Nutbeam, 2000, p. 263). Health literacy is often described in literature as a functional skill referring to the abilities of individuals to read and understand health information, such as appointment cards, prescribed medications, or medical directions given (Van Servellen, Brown, Lombardi, & Herrera, 2003). Health literacy also enables self-efficacy; the belief in one's own ability to be successful about one's care within the health care system (Cutilli, 2007). Nutbeam's definition of health literacy speaks to the empowerment of individuals and communities to achieve good health (Nutbeam, 2000).

### **Theoretical Framework: Nutbeam's Health Literacy Model**

Nutbeam (2000) explains that health literacy skills are founded on basic literacy acquisition and cognitive development, such as education and communication skills, respectively. Furthermore, when a person has inadequate reading or writing skills, formal health education initiatives are jeopardized, and ultimately the individual may be less likely to effectively participate in health promotion activities (Nutbeam, 2000). Functional health literacy in Nutbeam's health literacy framework, involves the individual acquiring health information through pamphlets, brochures, patient-provider encounters, or conventional education initiatives (Nutbeam, 2000). While functional health literacy helps to improve one's health by gaining greater knowledge and comprehension of a condition or illness, it is crucial that supportive environments exist so that individuals can also act upon advice given or knowledge obtained (Nutbeam, 2000). This latter aspect aligns with interactive health literacy, wherein decision-making depends on individual skills, such as motivation and confidence in one's abilities, developed in a supportive milieu (Nutbeam, 2000). Thus, access to health information, services and social support may occur with the health care provider or among supportive groups whereby an individual is supported to act on health information to achieve positive, personal health gains (Nutbeam, 2000). Lastly, critical health literacy is based on advanced knowledge and skills in support of health-enhancing political and social actions for entire communities (Nutbeam, 2000). For example, critical health literacy includes the development of knowledge and skills that contribute to individual or collective advocacy, as well as activist initiatives that are often necessary for political reform. With critical health literacy, individuals and/or groups have the knowledge and skills regarding aspects of health, but also the means by which socioeconomic, political, and environmental determinants benefit the population as a whole (Nutbeam, 2000).

Coleman and colleagues (2008) outlined in the Calgary Charter on Health Literacy, the core principles for health literacy curricula based on the belief that health literacy is the responsibility of the individual, health care professionals, and health systems. The Calgary Charter defines health literacy as the skills and abilities of individuals to utilize health information to make informed decisions to improve their wellbeing. These skills include "reading, writing, listening, speaking, numeracy...critical analysis...communication and interaction skills" (Coleman et al., 2008, p. 1). Furthermore, the accountability is shared among health care providers, organizations, and individuals to identify, retrieve, comprehend, exchange,

evaluate, and utilize health information, services, and supports (Coleman et al., 2008). As such, individuals with adequate health literacy skills will be better equipped to navigate the system and feel confident in doing so (Coleman et al., 2008).

### **Health Literacy, Type 2 Diabetes, and Adult Latinos**

Adequate health literacy skills enable individuals with diabetes to gain knowledge about their condition and modify certain behaviours when effective educational tools about diabetes care are established (Coffman et al., 2012; Williams et al., 1998). As health literacy decreases, an increase in the prevalence of diabetes is reported (CCL, 2008; Statistics Canada, 2005; Williams et al., 1998). U.S. statistics indicates a similar relationship between low health literacy and increased prevalence of diabetes among Latinos (Lopez & Grant, 2012). Achieving adequate health literacy skills may assist with diabetes management, such as proper monitoring of glucose levels, which requires individuals to understand health information, and apply prose and numerical abilities (Cavanaugh et al., 2008; Coffman et al., 2012; CCL, 2008).

Researchers have expressed some concerns that individuals with limited health literacy may not have an adequate knowledge base about their diabetes, or of necessary lifestyle and behavioural modifications required for proper monitoring (Cavanaugh, 2011; Cavanaugh et al., 2008; Williams et al., 1998). Cavanaugh and colleagues (2008) conducted a study of 398 adults with Type 1 and Type 2 diabetes to determine how numeracy affected diabetes control. The researchers found that when health literacy and diabetes-related numeracy skills were low, these individuals had poor diabetes knowledge, poor self-efficacy, and decreased glycemic control (Cavanaugh et al., 2008).

Furthermore, people with limited English proficiency (LEP) encounter barriers in the health service sector due to communication barriers (Graham, Jacobs, Kwan-Gett, & Cover, 2008). A review of hospital records revealed that 567 LEP participants had greater burden of disease relative to 1,162 English speaking individuals in Seattle, Washington (Graham et al., 2008). Graham et al. (2008) reported a significantly greater number of medical clinic visits per month for LEP individuals in their management of high blood pressure, diabetes mellitus, and cancer (Graham et al., 2008). The researchers concluded that increased service utilization was related to LEP participants' inability to access over-the-counter medications at the pharmacy or to use telephone triage due to language barriers (Graham et al., 2008).

Hu, Wallace, McCoy, and Amirehsani (2014) conducted a quasi-experimental longitudinal study to determine the effects of a Type 2 diabetes intervention program on Latino adults and their family members. The intervention, which consisted of eight weekly culturally tailored modules of diabetes information, was run by a nurse practitioner/trained educator (Hu et al., 2014). The researchers reported that family members should be included in diabetes education interventions (Hu et al., 2014). Hu and colleagues (2014) also found that individuals diagnosed with diabetes had better outcomes when they were supported by a knowledgeable family member. Both groups had renewed self-confidence in making necessary changes for diabetes management once they better understood the condition (Hu et al., 2014). Post intervention, both groups had greater knowledge about diabetes and glucose control (Hu et al., 2014).

### **Acculturation, Health Literacy, and Adult Latinos**

Acculturation is defined as a continuous, life-long process in which individuals shift between at least two cultural domains, and adopt or disregard cultural beliefs, values, traditions, and practices different from one's own (Lora et al., 2011; Berry, 2005; Marin & Gamba, 1996). These cultural traits can be freely embraced or forced upon the groups (Redfield, Linton, & Herskovits, 1936). This contrasts with cultural essentialism which is defined as a scheme of cultural beliefs that are innate and are unchanging that separate one culture from another (Grillo, 2003). In other words, individuals' perform culture in a way that aligns with the beliefs and values of an identifiable group (Grillo, 2003). Through acculturation, the dimensional process of learning and adapting to different customs and norms between cultures affects an individual's management of illness and navigation of services (Berry, 2005; Marin & Gamba, 1996). In contrast, a challenge with acculturation has been its simplification as a one-dimensional process (Rumbaut, 1997). For example, a Latino individual replaces their own cultural norms with customs belonging to a different cultural group. It could equally be seen as losing one's own cultural heritage (Marin & Gamba, 1996), parallel to our understanding of assimilation of cultures (Rumbaut, 1997). Yet, members of the group may hold certain attitudes that influence their decisions to intermingle, adapt, or dismiss the new traits in the process of acculturating to a different culture (Berry, Kim, Power, Young, & Bujaki, 1989). Culture, defined as the beliefs, behaviours, and customs of a group of people, constitutes a significant influence on the health of individuals and communities (Public Health Agency of Canada, 2010).

Cultural differences are seen with respect to disease-related knowledge, self-care activities, participation in preventive screening initiatives, and interactions with health care personnel (Coffman & Norton, 2010; Shaw, Huebner, Armin, Orzech, & Vivian, 2009; Shelton, Jandorf, Ellison, Villagra, & DuHamel, 2011; Thackeray et al., 2004). Lora and colleagues (2011) conducted a systematic review of the literature to understand how Latinos may be at a higher risk for chronic kidney disease (CKD) due to factors such as health literacy, acculturation, and social supports. Health outcomes and behaviours, such as management of end stage kidney disease, are influenced by acculturation and health literacy of Latino people (Lora et al., 2011). Limited health literacy and low acculturation impacts knowledge and behaviours (ie., calorie intake or physical activity) which contributes to advancement of CKD (Lora et al., 2011). Proficiency with the English language and health beliefs, as well as factors of acculturation, influence a person's health practices (Lora et al., 2011). Healthcare professionals having a better understanding of cultural practices, such as knowledge of staples in a Latino diet, may provide healthier options to their clients (Lora et al., 2011). Social support can also have a buffering effect on the negative impact that low health literacy and acculturation has on CKD advancement (Lora et al., 2011). For example, a Latino adults' dependence on their social support for knowledge may safeguard against disease progression (Lora et al., 2011).

In addition, cultural beliefs and the stigma associated with mental illness create barriers for Latino adults, particularly those with limited health literacy skills, in identifying and reporting signs and symptoms of depression to health care providers (Coffman & Norton, 2010). Low health literacy among Latinos meant individuals were not able to adequately locate resources and treatment programs, consequently contributing to their depressive state of mind (Coffman & Norton, 2010). Researchers found that Latino immigrants who had lived for less than 15 years in the US reported challenges due to language barriers, such as limited accessibility to employment or health care resources (Coffman & Norton, 2010). Latham and Calvillo (2009) reported that Latino participants who had residency in the United States for an average of 15.4 years still scored low on acculturation.

In contrast, in the United States, researchers' analyzed data from the National Health and Nutrition Examination 2007-2010 and concluded that higher acculturation among U.S. Latinos was associated with a higher risk of diabetes (O'Brien, Alos, Davey, Bueno, & Whitaker, 2014). As acculturation can cause great stress on immigrants, this may contribute to an increased body

mass index (BMI), stress-related physiological changes, and negative behaviour practices, such as high caloric diets with poor activity levels (O'Brien et al., 2014).

Other research has examined socio-cultural factors (e.g., fatalism), health literacy, and the frequency of preventive health screening among Latinos (Shelton et al., 2011; Thackeray et al., 2004; Thomson & Hoffman-Goetz, 2010, Weller et al., 1999). The existence of *fatalism*, the belief that an individual does not have the power over life events, among Latino groups showed reduced preventive health practices such as cancer screening (Shelton et al., 2011). Yet, as health literacy scores increased, Latino individuals were more likely to participate in preventive screening (Shelton et al., 2011). Thackeray et al. (2004) found that the belief that diabetes is God's plan for the person and therefore out of an individual's control was common among Latino adults and a potential contributor to ineffective diabetes behaviours and practices. Thus, being aware of existing cultural notions and practices, and creating culturally-sensitive awareness programs, in particular for diabetes treatment, will contribute to better health outcomes for Latino people (Lora et al., 2011; Thackeray et al., 2004).

The increased expectation by healthcare providers that individuals should take greater accountability for their health and make informed decisions about their own care (Moore, Blas, Prentice, Fletcher, & Vaughn, 2009), is often without regard for differences in health literacy skills, cultural, educational, or economic background (Shaw et al., 2009). Thus, norms and values regarding health and illness of cultural groups, affect the individual's capability to fully comprehend and take effective action on provided medical instructions (Shaw et al., 2009). Accordingly, this ability to access and utilize health information, resources, and advice is an important component of functional health literacy skill.

The impact culture has on health literacy is a research area yet to be fully explored (Van Servellen et al., 2003; Shaw et al., 2009; Thackeray et al., 2004). Cultural beliefs and values impact health literacy by an individual's capacity to recognize, utilize, and comply with health information and medical regimens (Coffman & Norton, 2010; Shaw et al., 2009). Thus, health providers may face challenges in identifying the cultural barriers that may impede compliance related to chronic illness management or screening programs (Shaw et al., 2009). For example, due to low health literacy, recent Latino immigrants may be unable to navigate the health services to obtain professional support for symptoms, such as depression (Coffman & Norton, 2010).

Brice et al. (2008) explored functional health literacy among Spanish-speaking patients in an acute care setting. Functional health literacy was described within the study as a person's capability to effectively use basic literacy through reading, writing and computer tasks to complete daily duties (Brice et al., 2008). The Test of Functional Health Literacy in Adults [TOFHLA] was administered to clients either in Spanish or English version. Results showed that 74% of Spanish-speaking clients scored as having marginal or inadequate functional health literacy (FHL) skills relative to 7% of English-speaking patients. Brice et al. (2008) concluded that number of years of completed schooling, self-identified reading abilities, and cultural influences may be predictors of functional health literacy.

Koskan, Friedman and Messias (2010) conducted a systematic review of the literature on health literacy with the focus on Latino communities. Twenty-eight research studies on health literacy and the U.S. Latino population were reviewed (Koskan et al., 2010). Latinos born abroad, with little education, and who identified themselves as Spanish-speaking (as compared to English-speaking) had poorer health literacy scores in the literature reviewed (Koskan et al., 2010).

A mixed methods study of health literacy was conducted to examine both the functional literacy levels and sources of health information of a group of Latino adults in the U.S. (Britigan, Murnan, & Rojas-Guyler, 2009). The researchers conducted 52 interviews with Latinos aged 18 or older, where when given the choice between Spanish and English languages, the majority of participants opted for the Spanish surveys (Bi-dimensional Acculturation Subscale [BAS] and the Short Version of the Test of Health Literacy in Adults [s-TOFHLA]) and interview components (Britigan et al., 2009). More than 94% of participants had sufficient acculturation in Spanish, while 36.5% were acculturated in English (Britigan et al., 2009). Regardless of the language of assessment (Spanish or English), over 80% of the participants scored as having adequate functional health literacy. These high scores are in opposition to the inadequate levels of health literacy among Latinos often reported in the literature (Brice et al., 2008; Koskan et al., 2010; Singleton & Krause, 2009). Yet, researchers are in agreement that individual characteristics, such as acculturation or education, do play a role in health literacy levels, for example in the Britigan et al. (2009) study, 52% of participants reported having a high school education or greater.



Cultural or language barriers can minimize the accessibility and utilization of health care services which may have detrimental effects on client outcomes (Britigan et al., 2009; Van Servellen et al., 2003; Thackeray et al., 2004). Van Servellen et al. (2003) conducted a health literacy intervention study on low income, HIV-positive Latino adults to improve their knowledge of HIV, their adherence to medication regimes, and to enhance satisfaction in patient-provider interactions. The researchers concluded that adherence to treatment in at-risk populations was improved among patients with low health literacy when providers took the time to clarify disease management information (Van Servellen et al., 2003). Furthermore, a higher level of education was a moderately strong predictor of understanding HIV terms and medication dispensing instructions.

Sudore et al. (2009) studied the effect of foreign language and communication interactions on health literacy and patient-physician interactions among English- and Spanish-speakers. They demonstrated that comprehension of health messages was futile when Spanish-speaking clients interacted with non Spanish-speaking physicians (Sudore et al., 2009). Importantly, Sudore et al. (2009) reported that health literacy skills do not act as a safeguard when language barriers exist, thus resulting in inadequate patient-physician interactions. To reduce language disparities, the researchers advise physicians to spend the extra time to effectively communicate medical plans and encourage patient interaction (Sudore et al., 2009), or use interpretive services as others have suggested (Singleton & Krause, 2009; Van Servellen et al., 2003).

Similarly, Leyva, Sharif, and Ozuah (2005) conducted a cross-sectional survey of parents with small children to determine how well Spanish-speaking Latino parents with LEP understood English written directions of a commonly prescribed medication. The researchers concluded that comfort in speaking English positively contributed to a parent's accuracy in following the instructions specified for a prescription, yet only 50% correctly demonstrated the correct medication dosage required (Leyva et al., 2005). While higher education was a determining factor in correct dosing, the majority of Latino parents with LEP were unable to understand the English language instructions given and only 22% were able to accurately dispense the medication (Leyva et al., 2005).

Coffman, Shobe, Dmochowski, and Fox (2007) conducted a descriptive correlational study with 99 Latino adults (aged 18 and older) living in North Carolina to examine the

utilization of health care services. Latinos with low literacy skills were less likely to access available community health services, as many were of lower-income, making the cost of health care unaffordable (Coffman et al., 2007). When low health literacy and cultural, financial, and educational constraints interplay, health services were not utilized by Latino individuals (Baker, Parker, Williams, Clark, & Nurss, 1997; Coffman et al., 2007).

In Canada, advancing our current understanding of health literacy and its association with various cultural groups, specifically with Latino communities, is much needed. Inasmuch, programs and community resources can be effectively implemented to prevent diseases and have better outcomes for Latino people living with chronic conditions.

### **Social Support, Diabetes, and Adult Latinos**

The Latino culture regards familial ties and social networks as a source of support for managing chronic illness, such as diabetes, chronic kidney disease, or hypertension (Caban et al., 2008; Caballero, 2005; Lora et al., 2011). An important factor in Latino culture is familismo (Caballero, 2005; Lora et al., 2011). Lora and colleagues report that “Hispanics have a strong sense of familismo, or a strong attachment to nuclear or extended families” (2011, p. 287). Thus, familismo is described as devotion individuals have to their families that surpass their own wishes (Caballero, 2005; Lora et al., 2011). This may also be seen by their strong support and dependency to relatives through the health and illness experience (Caballero, 2005; Ramal et al., 2012).

Lora et al. (2011) reported that social support networks, and their perceived effect, may work to safeguard an individual with low health literacy and acculturation. Moreover, the reliance one has on family members and other supports help a person manage acute illness or a chronic condition (Lora et al., 2011). Families play an essential role in diabetes management (Clark et al., 2009; Ramal et al., 2012). Qualitative studies have demonstrated the value family plays with chronic illness, in particular with diabetes (Clark et al., 2009; Weiler & Crist, 2009). Caregivers of loved ones with diabetes and individuals with diabetes are both affected by the disease (Ramal et al., 2012; Weiler & Crist, 2009). Both groups reported how a family member with diabetes can strain living conditions, finances, time, and social interactions within the household (Weiler & Crist, 2009). Latino families are seen as a single unit, such that when one family member is affected, the whole family unit is disturbed (Weiler & Crist, 2009).

Research conducted about Latinos with diabetes or having a family history of diabetes indicates that they have a sense of control over their health outcomes, yet still held certain cultural beliefs to illness which influenced their diabetes management (Latham & Calvillo, 2009; Ramal et al., 2012). Latham and Calvillo (2009) investigated effective diabetes management strategies for low acculturated Latino individuals from low-income Latino families recently diagnosed with Type 2 diabetes. The researchers concluded that Latino participants depended predominantly on family networks for health care support rather than other social networks, such as primary health providers (Latham & Calvillo, 2009). This was particularly pronounced among participants who were marginally acculturated with the host country (Latham & Calvillo, 2009). In contrast, Levinson, Kao, Kuby and Thisted (2005) reported that Latinos preferred to allow the physician to make the health care decisions. Furthermore, with advancing age, people depended on their physicians to make the choice for them, especially when they did not have family involved in their care (Levinson et al., 2005). In Latino families, men more commonly reported having their spouse support them with diabetes and monitoring of food choices, while Latino women did not feel as supported (Caban et al., 2008; Marquez et al., 2014).

Latino family members are expected to take on the roles of monitoring, counselling, and guiding their loved ones to maintain and manage their diabetes (Caban et al., 2008; Ramal et al., 2012; Weiler & Crist, 2009). Spousal support was more frequently conveyed by Spanish-speaking men with diabetes, compared to the reportedly less support received by Spanish-speaking women (Caban et al., 2008). Overall, supportive families have a great influence on health behaviours and positive lifestyle changes within a person's diabetes management (Fisher et al., 2000; Thackeray et al., 2004). Yet, if the Latino family does not support an individual's special diabetic dietary regimen or cost of care, diabetes is poorly managed (Caban et al., 2008; Hu et al., 2014). The social support, even if only perceived support, acts to augment the use of preventative health services and decrease adverse effects among Latino members who feel supported by their loved ones (Lora et al., 2011).

### **Age, Health Literacy, and Adult Latinos**

Evidence from a systematic integrative review of the literature demonstrated that older adults are at risk for poor health literacy, especially those individuals with less education or lower income (Cutilli, 2007). Recommendations from this review included the need for health care professionals to identify those individuals that have low health literacy, as they commonly

have poor health outcomes (Cutilli, 2007). Furthermore, the literature assessment on health literacy reveals that research is lacking for older groups and specific cultural groups, such as Latinos and African Americans, thus impeding adequate services to be developed for all people, in various contexts (Cutilli, 2007; Cutilli & Bennett, 2009). In particular, limited research is available regarding existing associations between age and the health literacy of Latino adults (Baker, Gazmararian, Sudano, & Patterson, 2000; Singleton & Krause, 2009).

In a cross-sectional study to determine the relationship between age and health literacy, Baker et al. (2000) assessed English and Spanish speaking seniors in the United States. Participants were given the S-TOFHLA and the Mini Mental State Examination (MMSE). As participants increased in age, the scores on the S-TOFHLA decreased (Baker et al., 2000). Baker et al. (2000) suggested that older adults with marginal health literacy skills may have a decline in their reading capabilities due to aging, thus the comprehension of written health information would become more of a challenge. The researchers conducted a hierarchical linear regression model, which showed an association between specific demographic factors and chronic conditions to functional health literacy (Baker et al., 2000). Of the chronic conditions investigated, diabetes was the only one that showed a significant negative association with functional health literacy in older adults (Baker et al., 2000). As the population ages, functional health literacy decreases, while the prevalence of diabetes increases (Baker et al., 2000; CCL, 2008; Statistics Canada, 2005).

Previous research has acknowledged that a negative association between age and health literacy exists (Baker et al., 2000; Billek-Sawhney & Reicherter, 2005; Statistics Canada, 2003). The process of reading entails having satisfactory vision acuity, mental clarity, and word and cognitive processing abilities in which all may deteriorate with increased age (Baker et al., 2000). Billek-Sawhney and Reicherter (2005) conducted a literature review of health literacy and its association with older adults. Negative health outcomes are associated with lower health literacy among chronic illness including diabetes, due to the life-long change in self-care behaviours and practices, such as adherence to medication regimens (Billek-Sawhney & Reicherter, 2005; CCL, 2008). Health care providers play a significant role in the selection of written health materials geared to an appropriate literacy level of an older adult client; in assisting clients with health information access; and in providing opportunities for clarifying information (Billek-Sawhney & Reicherter, 2005). Incorporating such teaching sessions is a

key to the successful management of an existing chronic condition. By enhancing the health literacy skills and the ability of family to support the older adult family member, clients are better able to adhere to their medication regimens and improve self-care activities (Billek-Sawhney & Reicherter, 2005; Faguy, 2004).

Wister, Malloy-Weis, Rootman and Desjardins (2010) based their research on the on the Canadian data from the 2003 International Adult Literacy and Life Skills Survey (IALSS). They examined the impact health literacy and long-term educational resources that enable older Canadians had on each other. Reading, computer usage, access to the Internet, and occasional library use, had positive associations with higher levels of health literacy (Wister et al., 2010). Recommendations to improve accessibility to facilitate computer usage and reading skills for older adults would promote adequate levels of health literacy (Wister et al., 2010). Furthermore, adults aged 16 to 65 who read printed materials, including books, newspapers, and websites scored up to 38 % higher than average in health literacy scores for their specific age group (Statistics Canada, 2003). Notably, promoting and enabling such educational practices may have a positive impact on adult learning and healthy routines. Furthermore, it is consistently recommended that future studies should include developing and evaluating interventions specific to various age groups and effectively identify health literacy levels of clients on routine assessments (Baker et al., 2000; Cutilli, 2007; Oldfield & Dreher, 2010).

### **Summary of Literature**

Health literacy is impacted by various factors, such as acculturation, social support, and diabetes knowledge. Limited research has investigated the unique associations these variables have to health literacy in adult Latinos within Canadian context.

### **Purpose of the Study**

The purpose of this study was to investigate the health literacy skills and information sources of adult Latinos living in Canada who either had diabetes or were an informal caregiver, current or past, with a family history of diabetes. This research also investigated the associations between health literacy, acculturation, diabetes knowledge, and social supports.

### **Research Questions, Hypotheses and Rationale**

1. What are the functional health literacy skills of adult Latinos who have Type 2 diabetes and caregivers with a family history of diabetes?

*Hypothesis:* A continuum (inadequate, marginal, adequate skills) of functional health literacy skill exists among Latino adults with Type 2 diabetes or a family history of diabetes (Cavanaugh et al., 2008; Sudore et al., 2009; Williams et al., 1998). This hypothesis is based on the fact that Latinos are at higher risk for developing diabetes and have an increased prevalence of diabetes within their cultural group (Creatore et al., 2010; Public Health Agency of Canada, 2012).

2. What association exists between acculturation and functional health literacy skills among adult Latinos who have diabetes or caregivers who have a family history of diabetes?

*Hypothesis:* Increased acculturation will be associated with increased health literacy in adult Latinos that have diabetes or a family history of diabetes. Since, the BAS instrument is based on language use, proficiency and media, it is hypothesized that as acculturation scores increase, people will increasingly be able to understand health care information and instruction and be able to navigate the health care system (Marin & Gamba, 1996). With limited language acquisition and use, health literacy is negatively impacted (Sudore et al., 2009). Specific cultural behaviours for Hispanic adults exist around diabetes, which may contribute to ineffective diabetes practices and self-care (Fisher et al., 2000; Thackeray et al., 2004). Poor language skills may also impede the access to valuable health information (Britigan et al., 2009).

3. What association exists between self-reported social support and functional health literacy skills among adult Latinos who have diabetes or caregivers with a family history of diabetes?

*Hypothesis:* Increased perceived social support will be associated with increased functional health literacy skills. Family is greatly valued in Hispanic culture (Thackeray et al., 2004). Family and social networks are seen as valuable sources of support with chronic illnesses, such as for diabetes management (Lora et al., 2011). Latino individuals sought out their family members for support of their diabetes management (Caban et al., 2008; Latham & Calvillo 2009). Social support has been linked to positive effects on quality of life measures, such as satisfaction with self, and enabling one to adapt to living

with diabetes (Latham & Calvillo, 2009). When social support was perceived as poor, the management of disease was also negatively impacted (Latham & Calvillo, 2009).

4. What association exists between diabetes knowledge and functional health literacy skills among adult Latinos living with diabetes or caregivers with a family history of diabetes?

*Hypothesis:* Increased diabetes knowledge is associated with increased functional health literacy skills. An assessment of an individual's comprehension of their condition will give insight into self-care behaviours and practices (Garcia, Villagomez, Brown, Kouzekanani, & Hanis, 2001). Low diabetic knowledge and poor glycemic control has been correlated with low health literacy and diabetes-specific numeracy skills in the US (Cavanaugh et al., 2008). Knowledge of Type 2 diabetes has been shown to be associated with health literacy, but clinical outcomes tested did not have any significant correlation with health literacy levels (Creatore et al., 2010). Furthermore, higher levels of health literacy have been associated with improved health status, such as a more controlled glycated hemoglobin (A1C) (Cavanaugh et al., 2008; Ishikawa, Takeuchi, & Yano, 2008). Thus, this could suggest that adequate health literacy skills may facilitate diabetes disease management (Cavanaugh et al., 2008; Ishikawa et al., 2008).

## **Methods**

### **Design and Sample**

This research study used a cross sectional, non-experimental design to examine the relationships of health literacy, diabetic knowledge, acculturation, and social support among adult Latinos diagnosed with diabetes and informal caregivers with a family history of Type 2 diabetes. Ethics approval was granted by the Western University Research Ethics Board.

**Participant sample.** Using the G-Power 3.1.2 application (Faul, Erdfelder, Lang, & Buchner, 2007), an estimated sample size was determined for this study. The power analysis with an alpha error probability of .05, power level of .80 (Faul et al., 2007), a medium effect size of .15, and four variables, gave an approximate sample size of 77. The four variables used were acculturation, social support, health literacy, and diabetes knowledge.

The following criteria was used to determine participant inclusion in the study: (1) male and female participants; (2) between the ages of 18 to 70; (3) self-identified as immigrants from Latin, Central, or South America; (4) reported they had lived in Southern Ontario for at least two

years (based on the assumption that individuals would have accessed and have some familiarity with the local health system and/or health-based resources); (5) individuals read, wrote, and comprehended either English and Spanish; and, (6) had a self-reported diagnosis of Type 2 diabetes; or, as an informal caregiver, current or past experience in caring for a loved one, who had Type 2 diabetes. Individuals were not eligible to participate in the study if they: (1) were under age 18 or older than 70; (2) self-identified a culture or country of origin different than the listed geographical areas mentioned in the inclusion criteria, as different cultures may experience health literacy differently (Singleton & Krause, 2009; Thackeray et al., 2004). As the interest of this particular study was on an individual's knowledge of diabetes, participants who had no direct experience with diabetes (either managing the disease or being a caregiver with no family history of diabetes) were excluded from participation.

### **Participant Recruitment**

Recruitment posters were placed at local community businesses, community centres, restaurants, and variety stores in various areas within a large urban community located within Southern Ontario. As part of the Latino community, the researcher was fluent in both Spanish and English language, and was aware of the community services that Latino adults frequented. Recruitment notices were also posted in dental and health clinics that were commonly visited by Latinos. Interested participants were asked to contact the researcher directly by telephone or through email if they were interested in participating in the research. Snowball sampling was also used to recruit participants. Snowball sampling occurs when a few eligible participants refer other people in their networks who also meet the outlined inclusion criteria for the study (Polit & Beck, 2008). Research participants passed on the researcher's contact information to a personal contact possibly interested in taking part in the study. Participants in the study were provided a \$10 coffee shop gift card in appreciation of their participation (Polit & Beck, 2008).

### **Data Collection**

A face-to-face meeting was arranged between the participant and the researcher on a date and time in a location that was convenient for both. Participation in this study was voluntary, and participants were given the option to end the meeting at any time. Participants were provided with the letter of information, a consent form to participate, and questionnaire package. The questionnaire package contained the following items: demographic survey, an assessment of functional health literacy (Newest Vital Sign) (Weiss et al., 2005), an assessment of perceived



social support (Multidimensional Scale of Perceived Social Support) (Zimet, Dahlem, Zimet, & Farley, 1988), an assessment of acculturation (Bidimensional Acculturation Scale for Hispanics) (Marin & Gamba, 1996), and a measurement of diabetes knowledge (Diabetes Knowledge Questionnaire) (Garcia et al., 2001). Participants were given time to ask questions prior to consenting to participate in the research. After obtaining written consent, demographic questions, the list of diabetes information sources, the Bidimensional Acculturation Scale for Hispanics and the Diabetes Knowledge Questionnaire were completed by the participant. The Multidimensional Scale of Perceived Social Support and the Newest Vital Sign surveys were administered by the researcher as per instrument guidelines. The one-time meeting lasted an average of 30 to 45 minutes.

### **Measurement Instruments**

A demographic questionnaire was administered to all participants, through which information regarding participants' gender, age, income, employment status, education level, marital status, and health conditions was collected (Appendix F). Demographic questions also inquired about the number of individuals living in the home of the participant, and the participants' years of residency in Southern Ontario. Participants were also asked about their preferred access strategies and sources of diabetic health information (Appendix F).

The following standardized data collection instruments were included in the study: The Newest Vital Sign (Weiss et al., 2005), the Bidimensional Acculturation Scale (Marin & Gamba, 1996), the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988), and the Diabetes Knowledge Questionnaire (Garcia et al., 2001). All instruments were available in both English and Spanish, and participants were given the choice to complete the questionnaire package in either language. Participants chose the language they were most comfortable with and completed all scales in that chosen language.

**Newest Vital Sign (NVS).** The NVS is an assessment instrument used to measure functional health literacy (Appendix I). The tool takes an estimated three minutes to administer and has been used in diverse clinical settings and practice environments (Weiss et al., 2005). It is available in English and Spanish (Weiss et al., 2005). The NVS tool is composed of an image of an ice-cream label with six corresponding questions to assess a participant's ability to understand prose and numeric health information (Weiss et al., 2005). To administer this assessment, the researcher reads each question to the participant and records their response on

the form. The participant is given a copy of the food label on which the assessment questions are based. For each correct answer, a score of one point is given with a maximum score of six points. Individuals with NVS scores that are equal to or greater than a score of four correct responses were considered to have adequate literacy, whereas participants that scored less than four correct responses are more likely to have limited health literacy (Weiss et al., 2005). The NVS has been administered to adults older than 18 years old (Weiss et al., 2005). The NVS in English ( $r = 0.59$ ) and Spanish ( $r = 0.49$ ) versions have good criterion validity with the Test of Functional Health Literacy [TOFHLA], a widely used health literacy instrument when  $p < .001$  (Weiss et al., 2005). The NVS instrument has good internal consistency in both languages as well ( $\alpha >$  for 0.76 in English and 0.69 in Spanish) (Weiss et al., 2005). Similar to the TOFHLA and the REALM, the NVS tool does not measure all aspects of health literacy but rather focuses on prose, numeracy and comprehension (Weiss et al., 2005).

**Bidimensional Acculturation Scale for Hispanics (BAS).** The BAS is a 24-item acculturation measurement tool (Appendix G), consisting of 12 items each for the non-Hispanic domain and 12-items for the Hispanic domain for three subscales (Marin & Gamba, 1996). The three subscales include Language Use, Linguistic Proficiency, and Electronic Media (Marin & Gamba, 1996). In the Language Use subscale (questions 1-6) participants rate their use of English and Spanish in conversation and thought-processes (Marin & Gamba, 1996). The Linguistic Proficiency subscale (questions 7-18) measures a participant's basic reading, writing, speaking, and comprehension skills in both English and Spanish (Marin & Gamba, 1996). Participants use a Likert-type scale to rate their response from 1 to 4, ranging from *Very Poorly* (1) to *Very Well* (4). The final subscale called Electronic Media (questions 19-24) asks how frequently individuals listen to the radio or to music, or watch television in both languages (Marin & Gamba, 1996). Both the Language Use and Electronic Media subscales have a similar Likert-type scale that ranges from 1 to 4, ranging from *Almost Never* (1) to *Almost Always* (4). Responses are calculated for all subscales of each cultural domain and a mean score is obtained to determine acculturation for each cultural group (Marin & Gamba, 1996). The BAS score is calculated for the average score taken for both the Hispanic (questions 4-6, 13-18, and 22-24) and Non-Hispanic (questions 1-3, 7-12, and 19-21) domains to determine the level of acculturation for the participant for both cultures (Marin & Gamba, 1996). Furthermore, if the BAS score for either domain is greater than 2.5, the participant is acculturated in the Hispanic

and/or non-Hispanic culture (Marin & Gamba, 1996). For example, an average score of 1.3 in the Hispanic domain and a score of 3.0 for the Non-Hispanic domain reflects an individual's acculturation with English language use, proficiency and media.

Biculturalism is shown when the participant scores greater than 2.5 in both the Hispanic and Non-Hispanic domains (Marin & Gamba, 1996). Alpha coefficients were established in measuring acculturation in various Hispanic groups, for both Mexico and Central American countries. Internal consistency for both the Hispanic domain ( $\alpha > 0.90$ ) and for the Non-Hispanic domain ( $\alpha > 0.96$ ) were acceptable. The validity of the three language subscales (Language Use, Linguistic Proficiency, and Electronic Media) was compared to the literature and to various criteria, such as self-identifying as "very Latino" to "very American" and being born outside the United States, the BAS held alpha coefficients ranging from 0.45 to 0.68. The BAS can be administered in English or Spanish language, but its generalizability to other subgroups needs to be further empirically supported (Marin & Gamba, 1996). The BAS is also a rapid test that can be used with participants in various clinical settings (Marin & Gamba, 1996).

**Multidimensional Scale of Perceived Social Support (MSPSS).** The MSPSS consists of 12 self-report items (Appendix J), and uses a seven point Likert-type format to rate individuals' perceived social support, ranging from *Very Strongly Disagree* (1) to *Very Strongly Agree* (7) (Zimet, Powell, Farley, Werkman, & Berkoff, 1990). There are three subscales (i.e., family, friends, significant others) to the MSPSS. Items for the social support subscales include family (questions 3, 4, 8, and 11), friends (questions 6, 7, 9, and 12), and significant other (questions 1, 2, 5, and 10). As per the protocol outlined for the MSPSS, the researcher reads each item loud, and participants report their agreement to each statement (Zimet et al., 1990). A mean score for each subscale and an overall scale score is determined. If the average score is above 3.5 (to a maximum mean score of 7) this indicates greater perceived social support; whereas a score below 3.5 indicates limited perceived support (Zimet et al., 1990). The total scale has a reported Cronbach's alpha reliability between .84 to .92 (Zimet et al., 1990). The test-retest reliability factor was .85 (Zimet et al., 1988). Factorial validity (Zimet et al., 1988, 1990) and construct validity (Zimet et al., 1988) were established for the subscales Family, Friends, and Significant Other. Gender differences showing women perceived greater support than men with Significant Others [ $F(1,273) = 20.28$ ] and Friends [ $F(1,273) = 32.73$ ] subscales, and the overall scale [ $p < 0.001$ ,  $F(1, 273) = 24.38$ ] was demonstrated (Zimet et al., 1990).

**Diabetes Knowledge Questionnaire (DKQ).** The DKQ-24 is a modified version of the original DKQ-60 questionnaire that is available in English and Spanish (Garcia et al., 2001). The DKQ-24 is a 24 item questionnaire (Appendix H), which is an easy-to-administer survey that assesses an individual's diabetic knowledge (Garcia et al., 2001). The DKQ-24 has three response options: *Yes*, *No*, and *I don't know*. For each correct item, a score of 1 is given and summed to give a final score of 24. The modified DKQ has shown good internal consistency (reliability coefficient of 0.78) and was shown to have content and criterion validity (Garcia et al., 2001). Each item on the DKQ-24 was content specific to diabetes. DKQ-24 was correlated with the DKQ-60 where  $r = 0.85$  with  $p < 0.001$ . Comprehension, readability, and interpretation of diabetic information are characteristics that underlie this instrument, and constitute measures that are important in determining functional literacy (Bastable, 2007).

### **Data Analysis**

The collected data was entered into Statistical Program for the Social Sciences (SPSS) Version 21 (IBM Corp, 2012) for analysis. Descriptive statistics were calculated for all study variables. Cronbach's alpha was computed for all measurement scales and subscales. Collected participant responses were assessed for normality of distribution (Polit & Beck, 2008) and two-tailed tests were conducted for significance. Independent t-tests were utilized to compare the study variables with participants with diabetes, family caregivers with a family history of diabetes, gender groups, and chosen language for survey completion. Pearson correlations were calculated to examine the relationships between study variables.

## **Results**

### **Descriptive Results**

There were 73 Latino participants in this research. Latino participants immigrated to Canada from Central America (49.3%), South America (47.9%), Mexico (1.4%), and Cuba (1.4%). The mean age of the participants was 46.6 years ( $SD = 11.86$ ), with females having an mean age of 44.4 years ( $SD = 11.22$ ) compared to males being 49.7 years ( $SD = 12.22$ ) of age. Participants with diabetes had a mean age of 51.7 years ( $SD = 10.86$ ) and participants as informal caregivers had a mean age of 42.2 years ( $SD = 10.99$ ). An estimated 41 participants (56.2%) have lived in Southern Ontario between 2 to 9 years, 16.4% of participants ( $n = 12$ ) were residents of Southern Ontario for 10 to 19 years, and 27.4% of participants ( $n = 20$ ) had lived in

Southern Ontario for 20 or more years. Refer to Table 1 for the complete sample demographics characteristics.

Table 1

*Demographic Characteristics for All Participants, Participants with Diabetes, and Participants as Informal Caregivers*

Demographics		All Participants		Participant with Diabetes [PD]	Participant as Informal Caregiver [PC]
		Frequency (n)	Percent (%)	Percent (%)	Percent (%)
<b>Participants:</b>	With Diabetes	34	46.6		
	Informal Caregivers	39	53.4		
<b>Gender:</b>	Male	31	42.5	44.1 (n=15)	41.0 (n=16)
	Female	42	57.5	55.9 (n=19)	59.0 (n=23)
<b>Survey Language:</b>	English	24	32.9	29.4	35.9
	Spanish	49	67.1	70.6	64.1
<b>Education:</b>	Less than High School	13	17.8	29.3	7.7
	High School Diploma	13	17.8	20.6	15.4
	Trade School/College Diploma	23	31.5	29.4	33.3
	University Degree	19	26.0	17.6	33.3
	Post Graduate/Doctorate	5	6.8	2.9	10.3
<b>Marital Status:</b>	Single	12	16.4	8.8	23.1
	Married	48	65.8	64.7	66.7
	Common-Law	5	6.8	8.8	5.1
	Divorced	6	8.2	11.8	5.1
	Widowed	2	2.7	5.9	0
<b>Religion:</b>	Catholic	44	60.3	55.9	64.1
	Protestant/Christian	23	31.6	23.5	25.6
	Other	3	4.1	17.6	5.2
	None	2	2.7	2.9	2.6
<b>Employment Status:</b>	Full-time	25	34.2	32.4	35.9
	Part-time	12	16.4	11.8	20.5
	Temporary/Contract	8	11.0	11.8	10.3
	Unemployed/ Disability/Retired	25	34.2	38.2	30.8
	*Missing Data			5.9	2.6
<b>Income:</b>	<\$19,999	19	26.0	17.6	17.9
	\$20,000 to \$49,999	15	20.6	23.6	17.9
	\$50,000 to \$99,999	7	9.5	8.7	10.3
	\$100,000+	1	1.4	0	2.6
	Did Not Answer	31	42.5	41.2	43.6
<b>Caregiver:</b>	For a Male				21.9 (n=16)
	For a Female				25.5 (n=15)
	For Both Genders				11.0 (n=8)

The two most reported chronic medical conditions reported by participants included hypertension and hyperlipidemia. Arthritis, asthma, thyroid disease, depression, irritable bowel syndrome, and gastritis were mentioned by participants as well. Of the family caregivers 64% had no chronic disease and 36% reported an average of one to two chronic conditions. Participants with diabetes reported having at least one other chronic condition (47%), and an estimated one-third of participants ( $n = 11$ ) had between three and five chronic medical illnesses. The descriptive statistics for the study variables are summarized in Table 1 for all participants, participants with diabetes and the informal caregiver groups. Reliability and validity for each measurement instrument and subscales, Cronbach's alpha, means and standard deviations were derived (Table 2).

Table 2

*Means, Standard Deviations, and Reliability Analysis for Instrument Scales and Subscales*

<b>Instrument</b>		<b>Mean</b>	<b>SD</b>	<b>Cronbach's alpha</b>
<b>Bidimensional Acculturation Scale for Hispanics</b>				
<i>Subscales (Hispanic):</i>	<i>Language Use</i>	10.41	1.82	.84
	<i>Linguistic Proficiency</i>	22.79	2.43	.92
	<i>Electronic Media</i>	7.19	2.42	.74
Overall Scale: Hispanic Domain		3.36	.39	.79
<i>Subscales (Non-Hispanic):</i>	<i>Language Use</i>	7.56	2.39	.85
	<i>Linguistic Proficiency</i>	16.51	5.15	.96
	<i>Electronic Media</i>	8.47	2.53	.80
Overall Scale: Non-Hispanic Domain		2.70	.75	.94
<b>Multidimensional Scale of Perceived Social Support</b>				
<i>Subscales:</i>	<i>Family</i>	6.10	.98	.88
	<i>Friends</i>	5.28	1.09	.89
	<i>Significant Other</i>	6.11	1.01	.87
Overall Scale:		5.83	.83	.90
<b>Diabetes Knowledge Test Questionnaire</b>		13.51	4.39	.81
<b>Newest Vital Sign</b>		2.73	2.13	.82



### Health Literacy Profile

Participants in this study had a mean NVS health literacy score of 2.73 ( $SD = 2.13$ ) which reflects limited health literacy (Table 3). A health literacy NVS score of less than four out of a possible six points is suggestive of individuals' difficulty in reading, assessing risk in numeracy, and accessing health information efficiently (Weiss et al., 2005). An independent t-test was generated to compare the health literacy scores of males and females. This analysis revealed a significant difference between males ( $M = 1.90, SD = 2.09$ ) and females ( $M = 3.33, SD = 1.97$ ); where women had greater health literacy scores than men ( $t = -2.99, p = .004$ , two tailed). While women demonstrated greater health literacy scores, the NVS scores for men and women indicated limited health literacy ability. Comparison of NVS mean scores between the participants that had diabetes ( $M = 2.12, SD = 2.16$ ) and the family member caregiver group ( $M = 3.26, SD = 1.98$ ) revealed that both groups demonstrated limited health literacy skills with significantly greater NVS scores among caregiver family members than those individuals diagnosed with Type 2 diabetes ( $t = 2.35, p = .022$ ). Participants that completed the NVS scale in English scored significantly higher than participants who completed the health literacy assessment in Spanish ( $t = -3.32, p < .001$ ).

Table 3

*Newest Vital Sign Scale– Means and Standard Deviations*

Group	Mean	SD
All Participants	2.73	2.13
Male	1.90	2.09
Female	3.33	1.97
PD	2.12	2.16
PC	3.26	1.98
Spanish Survey	2.18	2.02
English Survey	3.83	1.95

Note: PD = participants with diabetes; PC = caregiver participants

### Acculturation Profile

The average number of years participants lived in Southern Ontario was between two to nine years. Overall, participants showed biculturalism, as evidenced by scores greater than 2.5 in both the Hispanic ( $M = 3.36, SD = .39$ ) and non-Hispanic ( $M = 2.70, SD = .75$ ) domains (Marin

& Gamba, 1996). The possible scores can range from one to four for each culture domain. The acculturation scores between males and females were not significantly different for the Hispanic ( $t(71) = .49, p = .63$ ) and Non-Hispanic ( $t(71) = -.16, p = .88$ ) dimensions (Table 4). The participants with diabetes had higher mean scores in relation to the Hispanic dimension of acculturation ( $M = 3.48, SD = .33$ ) compared to informal family caregivers ( $M = 3.27, SD = .40$ ). In other words, participants with diabetes were more acculturated with the Spanish-based materials when it came to language use, linguistic proficiency, and electronic media. This stronger bond to their native culture was significant ( $t(71) = -2.47, p = .02$ ). In comparison, the family member caregiver group showed greater acculturation with the Non-Hispanic dimension ( $M = 2.98, SD = .65$ ) of the scale in their reported ability to communicate and use electronic media in English-based contexts. The group of informal family caregivers performed higher than the group with diabetes ( $M = 2.38, SD = .74$ ) in the non-Hispanic dimension, and this difference was statistically significant ( $t(71) = 3.69, p < .001$ ).

However, each group still showed greater comfort to Spanish-based contexts compared to the English-related ones, as suggested with the higher scores for the Hispanic dimension (Table 4).

Table 4

*The Bidimensional Acculturation Scale for Hispanics – Means and Standard Deviations*

Group	Hispanic Dimension		Non-Hispanic Dimension	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
All Participants	3.36	.39	2.70	.75
Male	3.39	.46	2.69	.72
Female	3.35	.33	2.72	.78
PD	3.48	.33	2.38	.74
PC	3.27	.40	2.98	.67

Note: PD = participants with diabetes; PC = caregiver participants

### **Social Support Profile**

Participants reported their perceived social support as satisfactory for Family ( $M = 6.10, SD = .98$ ), Friends ( $M = 5.28, SD = 1.09$ ), and Significant Other ( $M = 6.11, SD = 1.01$ ), with an overall total scale score of 5.83 ( $SD = .83$ ). Participants' scores above the 3.5 benchmark for each subscale determined whether they felt supported within their networks (Zimet et al., 1988).

The greater the score, the greater the support the respondent perceived themselves to have. Similarly, both males and females in the study reported their perceived social support as satisfactory (Table 5); there was no statistically significant difference between males and females for each of the subscales ( $t(71) = -.55, p = .58$ ). Comparison of the subscale means in regards to Family, Friends, and Significant Other was 6.08, 5.07, and 5.99 for Latinos with diabetes and means of 6.11, 5.47, 6.21 for informal family caregivers. Both groups viewed themselves as having adequate social support; there was no significant difference between the groups where Family ( $t(71) = .12$ ), Friends ( $t(71) = 1.59$ ), Significant Other ( $t(71) = .92$ ), and Overall Scale ( $t(71) = 1.12$ ), where  $p > .05$ .

Table 5

*Multidimensional Scale of Perceived Social Support – Means and Standard Deviations*

Group	Family: <i>M (SD)</i>	Friends: <i>M (SD)</i>	Significant Other: <i>M (SD)</i>	Total: <i>M (SD)</i>
All Participants	6.10 (.98)	5.28 (1.09)	6.11(1.01)	5.83 (.83)
Male	6.13 (1.05)	5.17 (.95)	6.00 (1.24)	5.77 (.92)
Female	6.07 (.94)	5.36 (1.19)	6.19 (.81)	5.87 (.76)
PD	6.08 (1.17)	5.07 (1.15)	5.99 (1.11)	5.71 (.92)
PC	6.11 (.80)	5.47 (1.01)	6.21 (.93)	5.93 (.73)

Note: PD = participants with diabetes; PC = caregiver participants

### **Diabetes Knowledge Profile**

Participants had a mean of 13.51 ( $SD = 4.39$ ) in the diabetic knowledge test. While the maximum attainable score is 24, participants just surpassed the 50% mark in their understanding of diabetes (Table 6). Females had a higher mean score ( $M = 14.28$ ) than male participants ( $M = 12.50$ ), but not statistically significant with diabetes knowledge ( $t(70) = -1.70, p > .05$ ).

Participants with diabetes ( $M = 13.00, SD = 4.00$ ) were not significantly different ( $t(68) = .87, p > .05$ ) in their knowledge of diabetes from the informal family caregiver group ( $M = 13.92, SD = 4.68$ ).

Table 6

*Diabetes Knowledge Questionnaire – Means and Standard Deviations*

Group	Mean	SD
All Participants	13.51	4.39
Male	12.50	4.73
Female	14.28	4.01
PD	13.00	4.00
PC	13.92	4.68

Note: PD = participants with diabetes; PC = caregiver participants

**Diabetes Information Needs and Preferred Sources of Information**

Of the ten listed sources of information, Internet-based resources ( $n = 49$ ), family members ( $n = 48$ ) and physicians ( $n = 39$ ) were identified as the top three resources for diabetic health information for all participants (Table 7). The least accessed resources for all categories of participants were the radio, spiritual guidance or religious support, and newspapers (Table 7). Print materials such as pamphlets were not reported as a routinely used resource of diabetic information by the participants.

Table 7

*Preferred Diabetes Information: Type and Source*

	Top 3 Accessed	Least 3 Accessed
All Participants ( $N = 73$ )	<ol style="list-style-type: none"> <li>1. Internet (<math>n = 49</math>)</li> <li>2. Family (<math>n = 48</math>)</li> <li>3. Doctor (<math>n = 39</math>)</li> </ol>	<ol style="list-style-type: none"> <li>1. Radio (<math>n = 54</math>)</li> <li>2. Spiritual/Religion (<math>n = 51</math>)</li> <li>3. Newspaper (<math>n = 49</math>)</li> </ol>
Participants with Diabetes ( $n = 34$ )	<ol style="list-style-type: none"> <li>1. Family (<math>n = 22</math>)</li> <li>2. Doctor (<math>n = 19</math>)</li> <li>3. Friends (<math>n = 17</math>)</li> </ol>	<ol style="list-style-type: none"> <li>1. Spiritual/Religion (<math>n = 27</math>)</li> <li>2. Radio (<math>n = 26</math>)</li> <li>3. Newspaper (<math>n = 25</math>)</li> </ol>
Participants as Informal Caregivers ( $n = 39$ )	<ol style="list-style-type: none"> <li>1. Internet (<math>n = 34</math>)</li> <li>2. Family (<math>n = 26</math>)</li> <li>3. Television (<math>n = 23</math>)</li> </ol>	<ol style="list-style-type: none"> <li>1. Radio (<math>n = 28</math>)</li> <li>2. Spiritual/Religion (<math>n = 24</math>)</li> <li>3. Newspaper (<math>n = 24</math>)</li> </ol>

## Test of Hypotheses

**Acculturation and health literacy.** The hypothesis that adult Latinos with greater acculturation scores would also possess greater functional health literacy skills was supported. The non-Hispanic dimension of the scale yielded a strong, and positively significant correlation to health literacy ( $r = .51, p < .001$ ). Therefore, participants who reported higher scores for English-based contexts, such as listening to music or watching television on English channels, also reported higher functional health literacy scores. In comparison, the Hispanic-based dimension of the scale, which included items such as talking and reading in Spanish, showed a moderately significant relationship to health literacy that was negatively correlated ( $r = -.30, p = .01$ ). In other words, when participants had greater scores in regards to various Spanish-based contexts, they reported lower functional health literacy skills.

**Social support and health literacy.** The hypothesis that a positive relationship exists between perceived social support and functional health literacy skills was not supported by the data. Perceived social support was not significantly correlated with functional health literacy ( $r = .03, p = .84$ ). Neither of the MSPSS subscales for Family, Friends, or Significant Other showed any significant correlation with functional health literacy skills, where  $r = -.02, r = .05, r = .03$ , respectively ( $p > .05$ ).

**Diabetes knowledge and health literacy.** The final hypothesis that diabetes knowledge increased with increased functional health literacy of individuals was supported by the data. There was a positive significant correlation between the two variables ( $r = .29, p = .02$ ). Thus, increased levels of functional health literacy were associated with higher levels of diabetes knowledge.

## Discussion

The purpose of this study was to investigate the relationships between health literacy, acculturation, social supports, and diabetes knowledge among Latino adults with diabetes or informal caregivers having a family history of diabetes. The functional health literacy skill of participants in this study was limited. This inadequacy in functional health literacy among Latinos is a common finding in the literature (Coffman & La-Rocque, 2012; Heinrich, 2012). Study findings by Heinrich (2012) indicated limited health literacy skills (as measured by the NVS) among Latino patients with diabetes at a community clinic. This would suggest that Latinos are at higher risk for a number of health care challenges. For individuals in this study,

self-care abilities such as reading, understanding diabetic information, or properly administering the correct dose of medication, may be compromised (Heinrich, 2012) given their low functional health literacy and low diabetes knowledge scores. Furthermore, the complexity of chronic disease management and health concerns increases with co-morbidities (Coffman et al., 2007; Williams et al., 1998). Participants in this study had multiple chronic diseases, including diabetes. Therefore, when health literacy is inadequate health may be compromised (Baker et al., 1997; Heinrich, 2012) as the required literacy skills are lacking to manage any disease and its related complications. Reading difficulties and numeracy challenges may make it difficult to understand the knowledge essential for disease prevention and management thus resulting in the undesirable effects and complications (Baker et al., 1997; Heinrich, 2012). Limited functional health literacy has previously been associated with self-reports of poor health (Baker et al., 1997; Kamimura, Christensen, Tabler, Ashby, & Olson, 2013).

One of the top three preferred sources of diabetes information for the diabetes group included the physician, but this was not the case for the participants of the family caregiver group. Similar findings were reported in which it was noted that when not highly acculturated with the American health care system, Latino immigrants to the U.S. more commonly held the physician in higher esteem (Hasnain, Schwartz, Girotti, Bixby, Rivera, & the UIC Experiences of Care Project Group, 2013). This aligns with this study's findings in that the participants with diabetes also had lower acculturation scores in the non-Hispanic domain, such as watching television or listening to music in English. The family caregiver group in this study instead preferred the Internet and television as preferred sources of diabetic information. Research evidence indicates that individuals with lower levels of education and health literacy tend to use television as a source of health information (Cutilli, 2010). The informal caregiver group with a family history of diabetes had higher education and higher functional health literacy than the participants with diabetes, but their health literacy skills were still limited. Internet and family members were also seen as diabetic information resources for all participants. Participants may use these resources to supplement the advice of health care professionals, and health care decisions can be made accordingly (Cutilli, 2010). For example, the Pew Research Centre reports that among Internet users, 66% of them have browsed for a specific illness or medical issue (Fox & Fallows, 2003). The Internet is also an adequate resource for individuals who are not as fluent with the English-language; different websites can be browsed to gather health

information, and language barriers can be minimized by locating Spanish-language sites (Britigan et al., 2009). Therefore, an individual's age, comfort level with browsing Internet sites, and overall trust in health resources may influence how diabetic health information will be attained (Cutilli, 2010). In addition, Latinos that have a health care provider report a better quality of care than those individuals that did not have a consistent provider (Livingstone, Munischkin, & Cohn, 2008). Furthermore, Pew Research Centre reports that 87% of Latinos believe that one should visit their health care provider only when they are sick (Livingstone et al., 2008), not necessarily as a preventative measure. Such cultural beliefs may impede a Latino adult in seeking medical advice to prevent diabetes complications or the disease itself.

Greater perceived social support, whether professional or familial support by individuals with diabetes positively influences their ability to cope with the illness, and increases the likelihood to adapt healthier behaviours and lifestyles (Goz, Karaoz, Goz, Ekiz, & Cetin, 2005). While perceived social supports of participants was not significantly associated with health literacy among this group of Latino participants, the associations between health literacy and each of acculturation and diabetes knowledge were statistically supported. There was a positive relationship between participants' diabetes knowledge and functional health literacy. Thus, individuals with better prose and numeracy skills also had better knowledge of diabetes. Ishikawa et al. (2008) also found an association between health literacy and diabetes knowledge, and reported that participants were able to understand and use health data to meet their needs when more advanced health literacy skills were used. Ishikawa et al. (2008) found an inverse association in which more diabetes complications arise when an individual has lower functional health literacy. In this study, participants with diabetes and the family caregiver with a family history of diabetes demonstrated limited health literacy. This is a distressing reality in that those individuals at higher risk of developing diabetes, or with diabetes themselves, may find it challenging to properly manage diabetes if prose and numeracy skills are inadequate.

Family members are a significant resource in diabetes prevention and management (Ramal et al., 2012). Their influence is an underlying theme that emerges among the Latino culture, as people with diabetes depend on their family to support them through dietary changes and lifestyle modification (Ramal et al., 2012). In the current research, the informal caregiver participants who were family members had similar, yet limited, knowledge of diabetes according to the instrument used. Both groups of participants answered only half of pertinent diabetic

questions correctly. This is a worrisome result, as Latinos with diabetes rely on family members for knowledge, support, and promotion of healthy routines (Ramal et al., 2012). On a similar note, Cavanaugh et al. (2008) reported that when people had low health literacy or poor numeracy abilities diabetes management was jeopardized, especially when numeracy played a fundamental role in diabetes care, such as the counting of daily carbohydrates or correct medication dosing.

While causal effects cannot be made, this research indicated that individuals with greater functional health literacy skills also had greater diabetes knowledge. This finding may suggest that improving health literacy initiatives for Latinos would prepare them with the prose and numeracy skills to obtain, understand, and act upon health information and services to inform their health care decisions regarding proper diabetic management; for example, glucose monitoring to adequately control their diabetes. Correctly monitoring blood sugar levels, increasing their knowledge of diabetes, and complying with treatment plans, may help to reduce diabetes complications and morbidities common among Latinos (Caballero, 2005; Caban et al., 2008). In addition, individualized approaches to increasing awareness and interventions with specific cultural communities, such as Latino immigrants, may be a solution (Heinrich, 2012; Thackeray et al., 2004; Weiler & Crist, 2009).

As hypothesized, participants' greater acculturation scores were associated with higher functional health literacy scores. The average number of years participants had lived in Southern Ontario was two to nine years. The participants with diabetes had higher acculturation scores within the Hispanic dimension than the Non-Hispanic dimension, and comparably higher scores than the family caregivers with a history of diabetes. Marin and Gamba (1996) attest that since the BAS is based on language use, linguistic proficiency and electronic media of both Spanish and English-speaking cultures, it is a more accurate portrayal of the bidimensional process individuals go through to learn and/or acquire values and norms of a new culture. In addition, the data from this study shows that individuals that were acculturated with the English-speaking culture were more health literate, compared to those that were less acculturated. It may be that individuals have more exposure to a new culture by engaging in English-based mass media (radio, print media) or by watching English-speaking television (Thomson & Hoffman-Goetz, 2010), which, in turn, may assist in interactions with the health care system and expectation setting.



Perceived social support has been associated with positive health status (Kamimura et al., 2013; Salinero-Fort et al., 2011). With greater perceived social supports, individuals report good health status (Salinero-Fort et al., 2011). Higher health literacy and greater perceived social support are shown to have positive effects on physical (Kamimura et al., 2013) and mental wellbeing (Goz et al., 2005; Kamimura et al., 2013; Latham and Calvillo, 2009). In this study there was no significant relationship between perceived social support and health literacy among participants. Even though participants reported a high perceived social support, the scale may not have adequately captured how these supports help them specifically with their chronic illness management. Previous research has indicated that perceived social supports may not differentiate between financial, emotional or other supports (Harris, Roberts, Biggs, Rocca, & Foster, 2014); and since the assessment questions did not relate to a particular experience, the assessment may not have fully captured the extent of the social support in relation to the context under investigation (Harris et al., 2014). Similarly in this study the assessment questions were of general support, not specific to blood glucose maintenance. More research is needed to determine how Latino health beliefs, such as *familismo* (the family's needs come first) or *fatalismo* (no control over life events) (Caballero, 2005) may influence social support, health literacy and diabetes management.

While many factors interact with health literacy, this study was able to provide further support to show how specific factors such as acculturation and diabetes knowledge interact with health literacy. As the Latino population continues to grow in Southern Ontario, health care providers need to strategize ways and invest in research to determine how health literacy can be improved among members of this ethnic group. This will support individuals living with diabetes and their family caregivers to optimally manage their diabetes.

### **Implications for Education, Research and Practice**

The results of this study have important implications for nursing education. Undergraduate nursing curriculums can be modified to increase understanding as to how the health literacy skills of local community groups influence chronic conditions and health education programs. Furthermore, greater awareness among nurses to the impact health literacy has on diabetic self-management interventions are in great need (Heinrich, 2012). To improve medication and treatment adherence plans, nurse researchers and clinicians need to work together with staff nurses to increase the health literacy skills of Latinos with diabetes and their

family caregivers (Clark et al., 2009). To improve adherence to diabetes self-management regimens, Type 2 diabetes educational initiatives that consider Latino belief systems and preferences should also be established (Weller et al., 1999).

Future research aimed at the identification of health literature, specifically online information resources appropriate for Latino populations with diabetes or informal caregivers with a family history of diabetes, is a priority. Investigating the source, quality and credibility of the health information is important in this technology-driven era. Research is needed on the use and preference of multimedia in health teaching (Williams et al., 1998) specifically by Latino adults with diabetes and caregivers with a family history of diabetes. This will allow innovative educational initiatives to be established that invite the participation of both individuals with diabetes and their family caregivers (Weiler & Crist, 2009).

Nurses need to include culturally sensitive tools in practice to capture the reality of Latino immigrants' health experiences. By improving understanding as to stressors that may exist, such as financial or psychosocial factors, nurses can connect Latino immigrants to appropriate community programs (Clark et al., 2009). For Latino immigrants, cultural belief systems and behaviours towards diabetes may differ compared to other ethnic groups (Weiler & Crist, 2009). As such, given the importance of familial support to diabetes management, health teaching needs to be specialized to suit the needs of Latino immigrants with diabetes and their informal caregivers (Weiler & Crist, 2009). Educating both Latino immigrants with diabetes and their families will have positive effects on their lives as they adapt to the disease or to prevent illness (Caban et al., 2008).

### **Limitations**

With all research there are limitations. In regards to the functional health literacy tool, prose and numeracy skills were assessed with the NVS scale. While the NVS is an easy, reliable tool to assess an individual's overall health literacy skills, the scale does not provide a complete picture of all the health literacy domains as conceptualized by Nutbeam (Osborn et al., 2007; Nutbeam, 2000). Furthermore, while the existence of many definitions for health literacy in the literature (Petch, Rootman & Ronson, 2004) allows for a variation of interpretations of the research results, it was crucial to utilize a research tool that paralleled the focus of the research based on Nutbeam's Health Literacy Model. Health literacy tools that were not only reliable and

validated in both English and Spanish, but aimed at adult populations ensured what was measured could be accurately interpreted within the sample.

The limitations in this study also arose in the recruitment phase. As most participants were recruited in the localized area, it limits generalization to other subgroups of Latinos due to the small sample sizes for each Latin American country. While it was challenging to recruit participants into the study, it helped that the researcher was fluent in both languages, thus obtaining data on individuals that may not have otherwise had the chance to participate. There were underlying cultural barriers at play; Latino individuals have a hesitancy to participate in research studies and are being underrepresented in the literature (Haack, Gerdes, & Lawton, 2014). Haack et al. (2014) reports that while recruitment and retention challenges exist, Latinos are more willing to participate when culturally appropriate strategies are implemented, such that Latino communities will benefit, or their ideals align with the dominant culture. In this study, participants were able to choose to complete the research in either English or Spanish, and family members were also included in the study, promoting interest for Latino recruitment (Haack et al., 2014). Thus, it would be helpful to conduct future studies on health literacy and diabetic health in other major cities to compare and generalize findings to other subgroups of Latino communities.

### **Conclusions**

The findings in this study provide support for Nutbeam's conceptual framework of health literacy (2000). The research advances the theoretical development of the framework and reinforces the multifaceted aspect of health literacy where factors such as acculturation and diabetes knowledge play a role in our understanding of diabetes among Latino immigrants. Living with a chronic disease, such as diabetes, affects more than the individual diagnosed with the disease; supportive family members and friends tend to also participate in the chronic disease experience. While this study did not find any association with social support and health literacy, this does not mean that this relationship does not exist; rather, this continues to be a challenge of research to expose all the factors that affect how a person perceives their social support (Latham & Calvillo, 2009).

As health literacy increases, acculturation of Latinos in English-speaking society can be observed. Over time, Latino adults with diabetes or caregivers having a family history of diabetes may acquire a greater diversity of Canadian customs and practices that are required to

navigate the health care system (Rootman & Ronson, 2005). Having strong English-proficiency allows for easier access to diabetes information and the utilization of available resources (Coffman et al., 2007; Graham et al., 2008). It is critical that health promotion strategies are aimed at increasing health literacy levels of Latino individuals at-risk or diagnosed with Type 2 diabetes. As health literacy is influenced by various factors it is important that health care professionals properly assess health literacy of Latino people, while also considering all causes that may influence health literacy skill.

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## **Chapter 3**

### **Discussion**

The purpose of this study was to examine the relationships between health literacy, acculturation, social support and diabetes knowledge among adult Latinos living with Type 2 diabetes and informal family caregivers with a family history of Type 2 diabetes. The findings suggest that health literacy is associated with elements of acculturation and diabetes knowledge, but no relationship to social support was supported in this research study.

#### **Implications for Nursing Practice**

To effectively support the Type 2 diabetes information needs among Latinos, nurses need to have knowledge about individuals' health literacy skills and the impact of culture (Heinrich, 2012). An individual's Latino background influences their ability to access, comprehend, evaluate, and apply health information to support their diabetes self-care regimens and symptom management (Carbone, Lennon, Torres, & Rosal, 2006; Cavanaugh et al., 2008; Ishikawa, Takeuchi, & Yano, 2008; Williams, Baker, Parker, & Nurss, 1998). It is essential that the nursing profession implement culturally sensitive approaches to their practice (Carbone et al., 2006; Heinrich, 2012) in order to properly identify Latinos at-risk for diabetes or living with diabetes, because health literacy skills are foundational to chronic disease self-management. Heinrich (2012) designates health literacy skills as a sixth vital sign, along with the assessment of temperature, pain, blood pressure, heart rate, and respiratory rate. To increase nurses' understanding of the health literacy skills of individuals, researchers have recommended implementing health literacy scales in initial assessments, which may allow nurses to recognize Latinos as vulnerable groups of people with limited health literacy (Adams et al., 2009; Cavanaugh et al., 2008; Williams et al., 1998). Yet, this may contribute to stigmatization of low literacy of individuals, such as Latinos, so its use in practice needs to be further explored (Bailey et al., 2014). Furthermore, it may not be feasible for clinicians to attempt to screen the health literacy of all clients (Bailey et al., 2014). Thus, applying a universal precaution approach to all health literacy assessments by simply providing easy-to-read print instructions and clear verbal directions will contribute to better care of all clientele (Wallace, 2010). This latter approach to utilize universal precautions for health literacy in regards to patient care and teaching is based on the assumption that health literacy skill is highly conditional (Wallace, 2010). All individuals may experience limited health literacy depending on their health situation and context (Wallace,

2010), such that immigrants have difficulty locating health services and building therapeutic relationships when linguistic barriers exist (Coffman & Norton, 2010). In this study, on average, individuals with a Latino cultural heritage had limited health literacy skills, which may suggest limited access to health information and resources required to support their diabetes self-care. Researchers suggest that health professionals should combine various forms of technology (e.g., audio, video, and computers) and easy-to-read materials to promote the health teaching of all clients (Billek-Sawhney & Reicherter, 2005; Brice et al., 2008; Heinrich, 2012). Techniques such as *teach back*, communicating with simple wording, and avoiding medical jargon in interactions may improve diabetes management (Adams et al., 2009; Sudore et al., 2009).

Awareness and integration of cultural customs and traditions contribute to the success of health promotion and prevention strategies, as they influence how people act upon health information given (Carbone et al., 2006; Clark et al., 2009). Teaching sessions that support healthy diabetes lifestyle changes may need to not only involve Latino individuals but family members (Baker et al., 1997; Carbone et al., 2006). This will encourage active participation of all family members to comprehend and apply the health information required to support their loved ones in optimally managing their diabetes (Baker et al., 1997; Carbone et al., 2006). The nursing professionals are in a prime position to be able to foster healthy behaviours in Latino people by personalizing the information given (Shaw et al., 2009; Thackeray et al., 2004) so Latinos can make informed decisions about their care (Cutilli, 2010). Inasmuch, being culturally sensitive to dietary preferences, beliefs, or behaviours may need to be further explored so nurses can provide relevant information and tailored care to the Latino communities they serve (Clarke et al., 2009; Weiler & Crist, 2009).

Other recommendations offered in the literature for improving the health status of Latino adults are to ensure readily available translation services, and to disseminate information in community settings where language specific information could be obtained (Graham et al., 2008; Heinrich, 2012; Thomson & Hoffman-Goetz, 2010). If health information is readily available in multiple languages, individuals that are non-English speaking will be able to comprehend the instructions and adapt the teachings into their self-care practices (Britigan et al., 2009). In regards to communication, it is an invaluable asset when healthcare professionals take the time to enforce the health teachings and medical advice given to Latino immigrants when cultural or language barriers exist (Sudore et al., 2009). Furthermore, recognizing that Latino adults that



report they speak English may not have the adequate health literacy skills or English-language proficiency to understand health information or medical directions given, will allow health care professionals to ensure interpreters are utilized (Sudore et al., 2009; Zun, Sadoun, & Downey, 2006).

As nurses, increasing awareness among ourselves as to the limited or inadequate literacy skills of Latinos should be a priority in our practice. The increased immigration and cultural diversity in Canada is a strong reason why it is imperative to explore the effects health literacy has on health promotion and prevention strategies targeted at specific community groups. Nurses can advocate for Latinos when structural, political, or cultural barriers exist in accessing and utilizing diabetes programs (Clark, Vincent, Zimmer, & Sanchez, 2009). In this way, nurses can assist Latino immigrants in obtaining the necessary skills and resources to manage or prevent diabetes. Becoming involved in health promotion policy and approaches in acute or community health care settings will ensure that Latino individuals are identified and holistically cared for (Clark et al., 2009). For example, nurses and researchers can strategize with Latino community groups and clinics to implement programs that address health disparities among Latino immigrants. Creating interventions to improve prose, numeracy, and communication skills among this community may provide the confidence an individual needs to self-manage their diabetes (Wallace, 2010). Furthermore, lasting therapeutic relationships may be built among Latino people, policy makers, and nursing professionals. Since many factors affect health literacy, becoming informed of cultural beliefs or customs that may impede or help Latinos manage their diabetes is a stepping-stone in this crisis. Becoming health care promoters and advocating for adequate allocation of community resources is critical to prevent the proliferation of diabetes.

### **Implications for Nursing Education**

Nurses need to increase their understanding of the debilitating effects low health literacy can have on at-risk clients, so that health care teaching and promoting strategies can be implemented in these critical interactions. Nurse researchers and nurse clinicians need to devise strategies to bring health literacy knowledge to the foundation of health promotion and prevention programs, and to engage practicing nurses to implement it into their daily assessments. By providing formal education on the benefits of simple wording on health issues

for the general population will assist health professionals in reaching all patients, including vulnerable groups (Zanchetta & Poureslami, 2006).

In undergraduate and graduate nursing education, increasing recognition of health literacy and awareness of cultural competency would provide insight for future nurses to implement quality care within primary- and acute-care settings (Cromier & Kotlik, 2009; Zanchetta & Poureslami, 2006). Furthermore, this emphasis within the nursing curriculum would yield positive changes for the cultural communities in their care, such that disadvantaged groups like Latino adults with diabetes and caregivers with a family history of diabetes would have better health outcomes (Cromier & Kotlik, 2009). Additional in-services for practicing nurses would provide a foundation to welcome such a change in practice. Inasmuch this change would allow nurses to tailor client care so health information and services can be accessed, utilized, and understood by Latino immigrants. Specifically, Latinos that interact with the health care system will be met by nurses that have greater understanding of the health needs of their cultural community (Britigan et al., 2009; Clark et al., 2009).

### **Recommendations for Future Research**

Health care providers need to develop culturally-sensitive tools for health literacy and provide further support for existing measurement tools that target Latino groups, such as the Bidimensional Acculturation Scale for Hispanics. The NVS has been used with various cultural groups (Heinrich, 2012; Kirk et al., 2011), including participants that have a greater risk of developing diabetes due to family history (Choi, Rush, & Henry, 2012). Research studies investigating various cultures emphasize that health education and promotion needs to consider language and culturally-sensitive material (Choi et al., 2012; Coffman & La-Roque, 2012). Researchers stress that being conscious of cultural influences on health literacy may assist clinicians in future initiatives meant to advance the health literacy of certain groups (Brice et al., 2008). Thus, research is needed that offers a better understanding as to the cultural barriers that may exist for Latino people regarding chronic disease prevention and management. The Latino culture would greatly benefit if noteworthy measurement tools that examine social support, diabetes knowledge, health literacy, and acculturation were also translated into the Spanish-language as more options would be available for research use.

More qualitative or mixed-method research needs to be conducted to explore the specific variables of this study and their interactions among Latino adults. Qualitative research would

expand our knowledge base as to the cultural beliefs or practices that influences why or how Latino immigrants with diabetes and informal caregivers act as they do (Caban, Walker, Sanchez, & Mera, 2008). Such research would be valuable in that more in-depth associations could be made. In this study, the associations between social support and health literacy were lacking as to the meaning individuals place on their personal relationships was not fully captured. Gaining a better perspective on the social supports and resources Latino immigrants use when navigating the Canadian health care system will be useful to clinical practice as current research is limited (Latham & Calvillo, 2009; Rootman & Ronson, 2005).

Further research as to how social support, such as family, affect the diabetes trajectory is still needed (Baker et al., 1997; Latham & Calvillo, 2009). Expanding nursing research on health literacy among Latino immigrants needs to be further explored. Conducting future research on the lives of Latino immigrants with diabetes and at-risk caregivers with a family history of diabetes will contribute to an improved understanding of health literacy as a multidimensional concept in various contexts of individual and population health (Garcia et al., 2001; Nutbeam & Kickbusch, 2000; Shaw et al., 2009).

Nurses and nursing unions can increase public awareness on healthier lifestyles and behaviour modifications, and to be involved in policy change (Clark et al., 2009). Building a healthier Latino population that is capable of properly navigating the Canadian health care system is within our grasp if we start now.

### **Summary and Conclusion**

Recognizing Latino communities are at high-risk for diabetes is a crucial step in identifying a societal disparity. As health care professionals, the importance of assessing health literacy could mean preventing complications of diabetes by improving its effective management among Latino immigrants with diabetes or caregivers with a family history of diabetes. Future studies need to continue to explore barriers Latinos face in properly managing their diabetes, whether it be cultural, political, systemic, or structural barriers that may exist. As health care professionals, we have a duty to society to promote healthy lifestyles and behaviours, and prevent diabetes in Latino communities.

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## APPENDICES

(A – K)



## Appendix A

### Letter of Information

Dear Participant:

My name is Ivonne Aguilar and I am a Master's student in the University of Western Ontario. You are being invited to take part in a research study looking at the health literacy in middle-aged Latino adults with diabetes in London, Ontario.

Your participation is voluntary, and you may refuse to participate or withdraw from the study at any time with no negative harm to you if you do so. The study will consist of a questionnaire package that will be available in both English and Spanish, whichever your language preference is. Time and location to administer the questionnaires will be scheduled at your convenience. All identifying data will be removed, and pseudonyms will be used to keep the questionnaire anonymous. Your responses will be analyzed as a group, keeping to the confidentiality and privacy principles. All research data will be destroyed according to the University of Western Ontario's Ethics Board guidelines.

Should you have any questions or concerns about this study, please contact me. If you have any questions about the conduct of this study or your rights as a research participant, you may contact the Office of Research Ethics, at the University of Western Ontario. Signing the consent form indicates your consent to participate in the study. Please return the attached consent form once complete on our initial meeting.

We look forward to hearing from you, and wish to thank you again for your time and participation.

Yours sincerely,

Ivonne Aguilar  
Master of Science in Nursing (C)  
Faculty of Health Sciences  
School of Nursing  
University of Western Ontario

## Appendix B

## Informed Consent Form

Research Project Title: Understanding Health Literacy in Middle-Aged Latino Adults with  
Diabetes in London, Ontario

I have read the letter of information, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

Participant Name (please print) \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

Researcher Name (please print) \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

## Appendix C

### Permission to Use Scale

#### Newest Vital Sign Instrument

No permission is required to use the Newest Vital Sign scale, available in English and Spanish. The instrument was developed by Weiss et al. (2005).

#### Multidimensional Scale of Perceived Social Support

No permission is required to use the Multidimensional Scale of Perceived Social Support, available in English and Spanish. The instrument was developed by Zimet, Dahlem, Zimet, and Farley (1988).

Ivonne Aguilar

MScN Candidate

University of Western Ontario

School of Nursing

## Appendix D

### Permission to Use Scale

#### Diabetes Knowledge Questionnaire (DKQ-24)

No permission is required to use the short version of the Diabetes Knowledge Questionnaire, available in both English and Spanish. Instrument designed by Garcia, Villagomez, Brown, Kouzekanani, and Hanis (2001).

Ivonne Aguilar

MScN Candidate

University of Western Ontario

School of Nursing

## Appendix E

### Permission to Use Scale

#### Bidimensional Acculturation Scale for Hispanics

No permission is required to use the Bidimensional Acculturation Scale for Hispanics as developed by Gerardo Marin & Raymond Gamba (1996). Instrument is available in both English and Spanish.

Ivonne Aguilar

MScN Candidate

University of Western Ontario

School of Nursing

## Appendix F

## Demographic Information

Gender (please circle):     M            F

Years living in London, ON and area (circle years): 1 2 3 4 5 6 7 8 9 10+ 15+ 20+

Age: \_\_\_\_\_

Religion: \_\_\_\_\_

Which family member has diabetes? \_\_\_\_\_

Marital status:

- Single
- Married
- Common-law
- Divorced
- Widowed

Number of People in your household: \_\_\_\_\_

Cultural background: \_\_\_\_\_ Country of Birth: \_\_\_\_\_

Do you consider yourself Latino/Hispanic? Yes \_\_\_\_\_ No \_\_\_\_\_

Occupation: \_\_\_\_\_

Chronic Condition(s):

- |  |                                  |
|--|----------------------------------|
| <input type="radio"/> Hypertension (HTN)     | <input type="radio"/> Arthritis  |
| <input type="radio"/> High Cholesterol       | <input type="radio"/> Depression |
| <input type="radio"/> Diabetes (Type 1 or 2) | <input type="radio"/> Other      |

\_\_\_\_\_

Level of Education (Highest level completed):

- |   |   |
|---|---|
| <input type="radio"/> Not completed school:<br>Highest grade completed<br>_____ | <input type="radio"/> Trade School      |
| <input type="radio"/> Elementary School   | <input type="radio"/> College Diploma   |
|   | <input type="radio"/> University Degree |

- High School Diploma

- Post-Secondary/Doctoral Degree

Employment Status:

- Full time (30+ hours/week)
- Part time (less than 30 hours/week)

- Casual/Contract/ Temporary
- Unemployed

Total Family Income:

- less than \$9,999
- \$10,000 - \$19,999
- \$20,000 - \$29,999
- \$30,000 - \$39,999
- \$40,000 - \$49,999
- \$50,000 - \$59,999

- \$60,000 - \$69,999
- \$70,000 - \$79,999
- \$80,000 - \$89,999
- \$90,000 - \$99,999
- over \$100,000
- choose not to answer

### Health Information Sources

Diabetic health information sources: Please indicate how often you use the following sources of information.

**Instructions: For the following items, please circle the response that indicates your use of health information sources. Please use the scale from 1 to 4 to indicate your response.**

1 = Never	2 = Rarely	3 = Often	4 = Always
-----------	------------	-----------	------------

Television

1                      2                      3                      4

Newspapers

1                      2                      3                      4

Pamphlet

1                      2                      3                      4

Doctor's office/visit

1                      2                      3                      4

Friends

1                      2                      3                      4

Family members

1                      2                      3                      4

Radio

1                      2                      3                      4

Spiritual leader/priest/pastor

1                      2                      3                      4

Internet

1                      2                      3                      4

Other\_\_\_\_



1                      2                      3                      4

### Demográfico

Género (por favor indique):    Masculino            Feminino

Años viviendo en London, ON (circle years) y area: 1 2 3 4 5 6 7 8 9 10+ 15+ 20+

Edad: \_\_\_\_\_

Que miembro de familia tiene diabetes (si usted no lo tiene) \_\_\_\_\_

Estado civil:

- Soltero
- Casado
- Acompañado/a
- Divorciado/a
- Viuda

Numero de personas viviendo en casa: \_\_\_\_\_

Cultura: \_\_\_\_\_ Religión: \_\_\_\_\_

País de nacimiento: \_\_\_\_\_

Se considera Latino/Hispano? Sí \_\_\_\_\_ No \_\_\_\_\_

Ocupación: \_\_\_\_\_

Condiciones crónicas:

- |  |                                  |
|--|----------------------------------|
| <input type="radio"/> Hipertensión (HTN)     | <input type="radio"/> Artritis   |
| <input type="radio"/> Colesterol alto        | <input type="radio"/> Depresión  |
| <input type="radio"/> Diabetes (Type 1 or 2) | <input type="radio"/> ¿Algo mas? |

\_\_\_\_\_

Nivel de educación (hasta qué grado usted hizo la escuela):

- |  |  |
|--|--|
| <input type="radio"/> No pude completar la escuela-<br>Más alto grado completado:<br>_____ | <input type="radio"/> Escuela vocacional/escuela de<br>artes y oficios |
| <input type="radio"/> Escuela primaria   | <input type="radio"/> Diploma del Colegio                              |
| <input type="radio"/> Sacar el bachillerato  | <input type="radio"/> Título de la Universidad                         |

- Título de doctoral/Escuela de postgrado

Trabajo/Empleo:

- Tiempo completo (mas de 35+ horas/semana)
- Tiempo parcial (menos de 35+ horas/semana)
- Trabajo casual/contrato/temporal
- Desempleado

Estimación de sueldo anual de su familia:

- Menos de \$9,999
- \$10,000 - \$19,999
- \$20,000 - \$29,999
- \$30,000 - \$39,999
- \$40,000 - \$49,999
- \$50,000 - \$59,999
- \$60,000 - \$69,999
- \$70,000 - \$79,999
- \$80,000 - \$89,999
- \$90,000 - \$99,999
- Más de \$100,000
- No quiero responder

### Recursos de Información de Salud

Instrucciones: Por favor indique cuantas veces usted ha usado los siguientes medios para buscar información de diabetes. Usando la escala de número uno a cuatro para indicar su respuesta.

1 = Nunca   2 = Pocas Veces   3 = Seguido   4 = Siempre
---

Televisión

1	2	3	4
---	---	---	---

Periódico

1	2	3	4
---	---	---	---

Folleto de información

1	2	3	4
---	---	---	---

Oficina del doctor

1	2	3	4
---	---	---	---

Amigos/Amigas

1	2	3	4
---	---	---	---

Miembros de familia

1	2	3	4
---	---	---	---

Por Radio

1	2	3	4
---	---	---	---

Apoyo espiritual (religioso)

1	2	3	4
---	---	---	---

Internet

1	2	3	4
---	---	---	---

¿Algo más? \_\_\_\_

1	2	3	4
---	---	---	---

Appendix G  
The Bidimensional Acculturation Scale for Hispanics (BAS)

<b>Language Use Subscale</b>	Almost Always	Often	Sometimes	Almost Never
1. How often do you speak English?	4	3	2	1
2. How often do you speak in English with your friends?	4	3	2	1
3. How often do you think in English?	4	3	2	1
4. How often do you speak Spanish?	4	3	2	1
5. How often do you speak in Spanish with your friends?	4	3	2	1
6. How often do you think in Spanish?	4	3	2	1
<b>Linguistic Proficiency</b>	Very Well	Well	Poorly	Very Poorly
7. How well do you speak English?	4	3	2	1
8. How well do you read English?	4	3	2	1
9. How well do you understand television programs in English?	4	3	2	1
10. How well do you understand radio programs in English?	4	3	2	1
11. How well do you write in English?	4	3	2	1
12. How well do you understand music in English?	4	3	2	1
13. How well do you speak Spanish?	4	3	2	1
14. How well do you read Spanish?	4	3	2	1
15. How well do you understand television programs in Spanish?	4	3	2	1
16. How well do you understand radio programs in Spanish?	4	3	2	1
17. How well do you write in Spanish?	4	3	2	1
18. How well do you understand music in Spanish?	4	3	2	1
<b>Electronic Media Subscale</b>	Almost Always	Often	Sometimes	Almost Never
19. How often do you watch television programs in English?	4	3	2	1

20. How often do you listen to radio programs in English?	4	3	2	1
21. How often do you listen to music in English?	4	3	2	1
22. How often do you watch television programs in Spanish?	4	3	2	1
23. How often do you listen to radio programs in Spanish?	4	3	2	1
24. How often do you listen to music in Spanish?	4	3	2	1

## The Bidimensional Acculturation Scale for Hispanics: Spanish Version

<b>Language Use Subscales</b>	<b>Casi Siempre</b>	<b>Frecuentamente</b>	<b>A veces</b>	<b>Casi Nunca</b>
1. ¿Con qué frecuencia habla usted inglés?	4	3	2	1
2. ¿Con qué frecuencia habla usted en inglés con sus amigos?	4	3	2	1
3. ¿Con qué frecuencia piensa usted en inglés?	4	3	2	1
4. ¿Con qué frecuencia habla usted español?	4	3	2	1
5. ¿Con qué frecuencia habla usted en español con sus amigos?	4	3	2	1
6. ¿Con qué frecuencia piensa usted en español?	4	3	2	1
<b>Linguistic Proficiency</b>				
	<b>Muy Bien</b>	<b>Bien</b>	<b>No muy bien</b>	<b>Muy mal</b>
1. ¿Qué tan bien habla usted inglés?	4	3	2	1
2. ¿Qué tan bien lee usted en inglés?	4	3	2	1
3. ¿Qué tan bien entiende usted los programas de televisión en inglés?	4	3	2	1
4. ¿Qué tan bien entiende usted los programas de radio en inglés?	4	3	2	1
5. ¿Qué tan bien escribe usted en inglés?	4	3	2	1
6. ¿Qué tan bien entiende usted música en inglés?	4	3	2	1
7. ¿Qué tan bien habla usted español?	4	3	2	1
8. ¿Qué tan bien lee usted en español?	4	3	2	1
9. ¿Qué tan bien entiende usted los programas de televisión en español?	4	3	2	1

10. ¿Qué tan bien entiende usted los programas de radio en español?	4	3	2	1
11. ¿Qué tan bien escribe usted en español?	4	3	2	1
12. ¿Qué tan bien entiende usted música en español?	4	3	2	1
<b>Electronic Media Subscales</b>	Casi Siempre	Frecuentamente	A veces	Casi Nunca
13. ¿Con qué frecuencia ve usted programas de televisión en inglés?	4	3	2	1
14. ¿Con qué frecuencia escucha usted programas de radio en inglés?	4	3	2	1
15. ¿Con qué frecuencia escucha usted música en inglés?	4	3	2	1
16. ¿Con qué frecuencia ve usted programas de televisión en español?	4	3	2	1
17. ¿Con qué frecuencia escucha usted programas de radio en español?	4	3	2	1
18. ¿Con qué frecuencia escucha usted música en español?	4	3	2	1

## Appendix H

## Diabetes Knowledge Questionnaire - English

Item	Question	Yes	No	I don't know
1	Eating too much sugar and other sweet foods is a cause of diabetes.			
2	The usual cause of diabetes is lack of effective insulin in the body.			
3	Diabetes is caused by failure of the kidneys to keep sugar out of the urine.			
4	Kidneys produce insulin.			
5	In untreated diabetes, the amount of sugar in the blood usually increases.			
6	If I am diabetic, my children have a higher chance of being diabetic.			
7	Diabetes can be cured.			
8	A fasting blood sugar level of 210 is too high.			
9	The best way to check my diabetes is by testing my urine.			
10	Regular exercise will increase the need for insulin or other diabetic medication.			
11	There are two main types of diabetes: Type 1 (insulin-dependent) and Type 2 (non-insulin-dependent).			
12	An insulin reaction is caused by too much food.			
13	Medication is more important than diet and exercise to control my diabetes.			
14	Diabetes often causes poor circulation.			
15	Cuts and abrasions on diabetics heal more slowly.			
16	Diabetics should take extra care when cutting their toenails.			
17	A person with diabetes should cleanse a cut with iodine and alcohol.			
18	The way i prepare my food is as important as the foods I eat.			
19	Diabetes can damage my kidneys.			
20	Diabetes can cause loss of feeling in my hands, fingers, and feet.			
21	Shaking and sweating are signs of high blood sugar.			
22	Frequent urination and thirst are signs of low blood sugar.			
23	Tight elastic hose or socks are not bad for diabetes.			
24	A diabetic diet consists mostly of special foods.			



## Diabetes Knowledge Questionnaire - Spanish

Item	Preguntas	Si	No	No Se
1	El comer mucha azucar y otras comidas dulces es una cause de la diabetes.			
2	La cause comun de la diabetes es la falta de insulin efectiva en el cuerpo.			
3	La diabetes es causada porque los rinones no pueden mantener el azucar fuera de la orina.			
4	Los rinones producir la insulin.			
5	En la diabetes que no se esta tratando, la cantidad de azucar en la sangre usualmente sube.			
6	Si yo soy diabetic, mis hijos tendran mas riesgo de ser diebeticos.			
7	Se puede curar la diabetes.			
8	Un nivel de azucar de 210 en prueba de sangre hecha en ayunas es muy alto.			
9	La major manera de checar mi diabetes es hacienda pruebas de orina.			
10	El ejercicio regular aumentara la necesidad de insulin u otro medicamento para la diabetes.			
11	Hay dos tipos principiiales de diabetes: Tipo 1 (dependiente de insulin) y Tipo 2 (no-dependiente de insulin).			
12	Una reaccion de insulin es causa por mucha comida.			
13	La medicina es mas importante que la dieta y el ejercicio para controlar mi diabetes.			
14	La diabetes frecuentemente cause mala circulacion.			
15	Cortaduras y rasguenos cictrizan mas despacio en diabeticos.			
16	Los diabeticos deberian poner cuidado extra al cortarse las unas de los dedos de los pies.			
17	Una persona con diabetes deheria limpiar una cortadura primero yodo y alcohol.			
18	La manera en que prepare mi comida es igual de importante que las comidas que como.			
19	La diabetes puede danar mis rinones.			
20	La diabetes puede causer que no sienta en mis manos, dedos y pies.			
21	El temblar y sudar son senales de azucar alta en la sangre.			
22	El orinar seguido y la sed son senales de azucar baja en la sangre.			
23	Los calcetines y las medias elasticas apretadas no son malos para los diabeticos.			
24	Una dieta diabetic consiste principalmente de comidas especiales.			

## Appendix I

## Newest Vital Sign

For both the English and Spanish pdf files:

<http://www.pfizerhealthliteracy.com/physicians-providers/NewestVitalSign.aspx>

## Newest Vital Sign – English version

**READ TO SUBJECT:**

**This information is on the back of a container of a pint of ice cream.**

1. If you eat the entire container, how many calories will you eat?  
\_\_\_\_\_
2. If you are allowed to eat 60 grams of carbohydrates as a snack, how much ice cream could you have?  
\_\_\_\_\_
3. Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42g of saturated fat each day, which includes one serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day?  
\_\_\_\_\_
4. If you usually eat 2,500 calories in a day, what percentage of your daily value of calories will you be eating if you eat one serving?  
\_\_\_\_\_

**READ TO SUBJECT:**

**Pretend that you are allergic to the following substances: penicillin, peanuts, latex gloves, and bee stings.**

5. Is it safe for you to eat this ice cream?  
\_\_\_\_\_
6. (Ask only if the patient responds “no” to question 5): Why not?  
\_\_\_\_\_

## Newest Vital Sign – Spanish version

**LEA AL PACIENTE:****Esta información aparece en el reverse de un envase de helado.**

1. Si usted se come todo el helado en el envase, cuantas calorías habrá consumido?  
\_\_\_\_\_
2. Si a usted le recomendaron consumir 60 gramos de carbohidratos en la merienda, cuanto helado puede comer?  
\_\_\_\_\_
3. Su médico le aconseja reducir la cantidad de grasas saturadas en su dieta. Usted normalmente consume 42 gramos de grasa saturada al día, que incluye una porción de helado. Si deja de comer helado, cuantos gramos de grasa saturada consumiría cada día?  
\_\_\_\_\_
4. Si usted normalmente come 2500 calorías Habrá consumido si se come una porción?  
\_\_\_\_\_

**LEA AL PACIENTE:**

**Imagine que es alérgico/a a las siguientes sustancias: Penicilina, cáchuate (maní), guantes de látex y picaduras de abeja.**

5. Puede comer este helado con seguridad?  
\_\_\_\_\_
6. (Solamente si responde “no” a pregunta 5): Porque no?  
\_\_\_\_\_

## Appendix J

## Multidimensional Scale of Perceived Social Support – English Version

**Instructions: I would now like to change to a completely different area of questions. We are interested in knowing more about what type of support you have around you when you get sick.**

**For each of the next 12 statements, I will read the statement and then ask if you [agree], [disagree], or**

**[neither agree nor disagree] with the statement. Listen to each statement carefully, and then indicate how you feel about each statement.**

**1. There is a special person who is around when I am in need.**

Do you agree, disagree, or neither agree nor disagree with this statement?

If “Agree:” Do you agree mildly, strongly, or very strongly? Circle response.

If “Disagree:” Do you disagree mildly, strongly, or very strongly? Circle response.

If “Neither:” Circle response.

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**2. There is a special person with whom I can share my joys and sorrows.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**3. My family really tries to help me.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**4. I get the emotional help and support I need from my family.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**5. I have a special person who is a real source of comfort to me.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**6. My friends really try to help me.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**7. I can count on my friends when things go wrong.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**8. I can talk about my problems with my family.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**9. I have friends with whom I can share my joys and sorrows.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**10. There is a special person in my life who cares about my feelings.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**11. My family is willing to help me make decisions.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

**12. I can talk about my problems with my friends.**

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neither	Mildly Agree	Strongly Agree	Very Strongly Agree

Multidimensional Scale of Perceived Social Support – Spanish Version

**Instrucciones:** Ahora quisiera hacerle preguntas en una área totalmente diferente. Estamos interesados en saber más sobre qué tipo de ayuda usted tiene alrededor de usted cuando se enferma.

Para cada de las 12 declaraciones siguientes, leeré la declaración y después le preguntaré si usted está [de acuerdo], [desacuerdo], o [ni de acuerdo o desacuerdo] con la declaración. Escuche cada declaración cuidadosamente, y después indique cómo usted se siente sobre cada declaración.

**1. Hay una persona especial que está cerca cuando tengo necesidad.**

Usted está, de acuerdo, desacuerdo, o ni de acuerdo o desacuerdo con la declaración?

*Si respondió que esta “de acuerdo:”* Usted está de acuerdo, moderadamente, fuertemente, o muy fuertemente? *Circule la respuesta.*

*Si respondió que esta “de desacuerdo:”* Usted esta desacuerdo, moderadamente, fuertemente, o muy fuertemente? *Circule la respuesta.*

*Si respondió que “ni está de acuerdo o desacuerdo:”* *Circule la respuesta.*

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertemente de acuerdo	Muy fuertemente de acuerdo

**2. Hay una persona especial con quien puedo compartir mis alegrías y dolores.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertemente de acuerdo	Muy fuertemente de acuerdo

**3. Mi familia realmente me trata de ayudar.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertemente de acuerdo	Muy fuertemente de acuerdo

**4. Yo recibo el apoyo y ayuda emocional que necesito de mi familia.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertemente de acuerdo	Muy fuertemente de acuerdo

**5. Tengo una persona especial que es una verdadera fuente de consuelo para mí.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertement e de acuerdo	Muy fuertemente de acuerdo

**6. Mis amigos realmente tratan de ayudarme.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertement e de acuerdo	Muy fuertemente de acuerdo

**7. Puedo contar en mis amigos cuando las cosas van mal.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertemente de acuerdo	Muy fuertemente de acuerdo



**8. Puedo hablar de mis problemas con mi familia.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertemente de acuerdo	Muy fuertemente de acuerdo

**9. Tengo amigos con quienes puedo compartir mis alegrías y dolores.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertemente de acuerdo	Muy fuertemente de acuerdo

**10. Hay una persona especial en mi vida que le importa mis sentimientos.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertemente de acuerdo	Muy fuertemente de acuerdo

**11. Mi familia está dispuesta a ayudarme a tomar decisiones.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertemente de acuerdo	Muy fuertemente de acuerdo

**12. Puedo hablar de mis problemas con mis amigos.**

1	2	3	4	5	6	7
muy fuertemente desacuerdo	Fuertemente desacuerdo	Ligero desacuerdo	Ni de acuerdo ni de desacuerdo	Ligeramente de acuerdo	Fuertemente de acuerdo	Muy fuertemente de acuerdo

## Appendix K



## Use of Human Participants - Ethics Approval Notice

**Principal Investigator:** Dr. Lorie Donelle

**File Number:** 12-001

**Review Level:** Delegated

**Approved Local Adult Participants:** 77

**Approved Local Minor Participants:** 0

**Protocol Title:** An investigation of health literacy, acculturation, and social supports among adult Latinos with diabetes in Southern Ontario

**Department & Institution:** Health Sciences\Nursing, Western University

**Sponsor:**

**Ethics Approval Date:** June 15, 2012 **Expiry Date:** December 31, 2012

**Documents Reviewed & Approved & Documents Received for Information:**

Document Name	Comments	Version Date
Western University Protocol		
Letter of Information & Consent	June 2012	
Advertisement	Poster	

This is to notify you that The University of Western Ontario Research Ethics Board for Health Sciences Research Involving Human Subjects (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices Consolidated Guidelines, and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced revision(s) or amendment(s) on the approval date noted above. The membership of this REB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the University of Western Ontario Updated Approval Request Form.

Members of the HSREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the HSREB.



**Western  
Research**

Research Ethics

Use of Human Participants - Ethics Approval Notice

Principal Investigator: Dr. Lorie Donelle  
 File Number:  
 Review Level: Delegated  
 Approved Local Adult Participants: 77  
 Approved Local Minor Participants: 0  
 Protocol Title: An investigation of health literacy, acculturation, and social supports among adult Latinos with diabetes in Southern Ontario  
 Department & Institution: Health Sciences/Nursing, Western University  
 Sponsor:  
 Ethics Approval Date: September 25, 2012 Expiry Date: December 31, 2012  
 Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
Revised Western University Protocol	Revised participant inclusion criteria - To support the hypothesis in this research about support systems, family members of people with diabetes will be invited to participate. Please review inclusion criteria to include both Latino adults with diabetes and family members of Latino people with diabetes. Individuals will be excluded from participation if they are not a primary family member / caregiver of a Latino family member with diabetes.	

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## Curriculum Vitae

**Name:** Ivonne Aguilar

**Post-Secondary Education  
And Degrees:** The University of Western Ontario  
London, Ontario  
1999-2008 BSc (Biology)

Ryerson University  
Toronto, Ontario  
2003-2007 BScN

**Related Work Experience:** London Health Sciences Centre,  
London, Ontario  
Staff Nurse, June 2007- present

University of Western Ontario  
London, Ontario  
Research Assistant, 2009-2011

**Professional Memberships:** College of Nurses of Ontario  
Registered Nurses Association of Ontario  
Ontario Nurses Association